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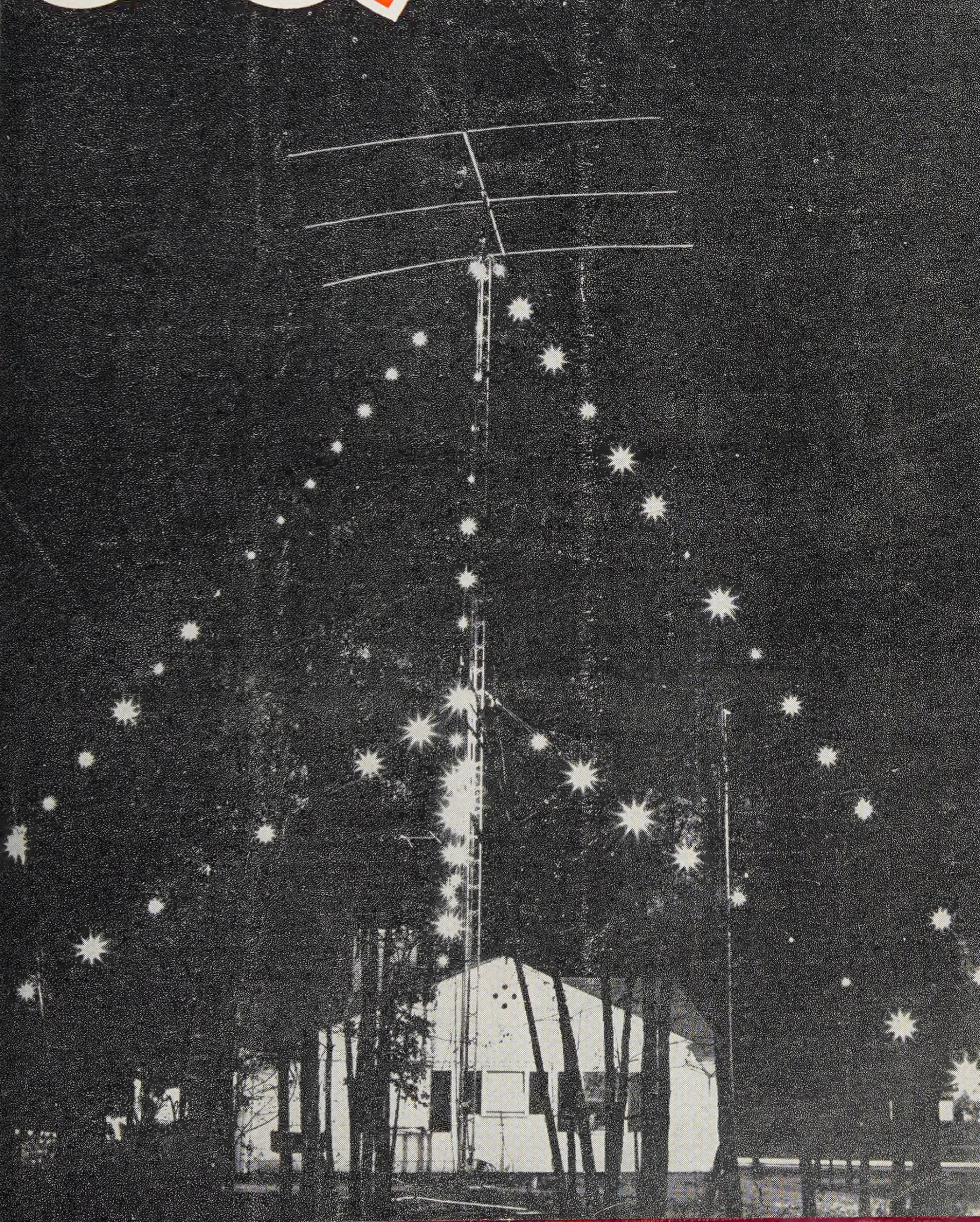
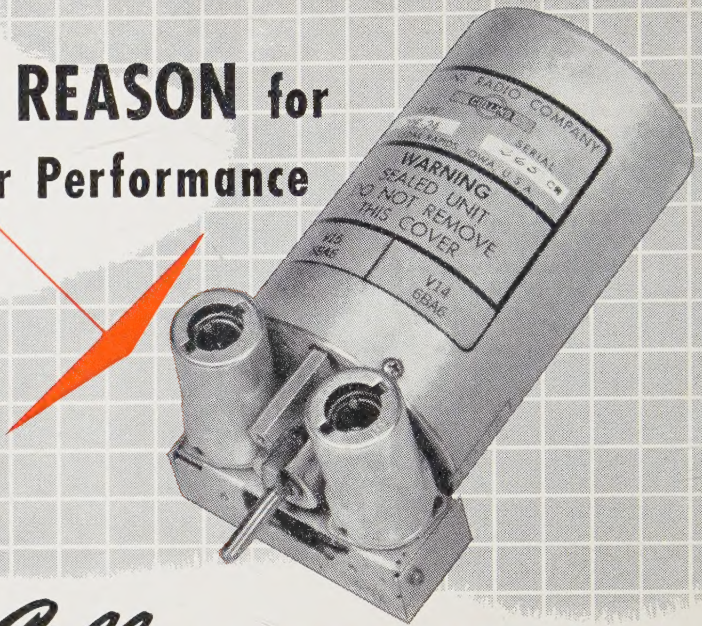
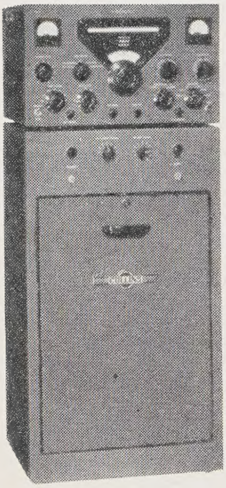
RADIO AMATEURS' JOURNAL

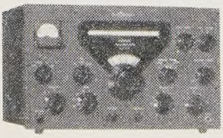


ANOTHER REASON for Top Amateur Performance



Collins PRECISION VFO





Another reason for the superior performance of Collins KWS-1 Transmitter and 75A-4 Receiver is the use of Collins Variable Frequency Oscillator — famous for its linear calibration and stable output. The units in the KWS-1 and 75A-4 are designed specifically for Amateur operations and are 100% tested under lab conditions to rigid specifications.

ACCURACY—With Collins VFO, you accurately set dial calibration to 1 dial division (1 kc) on any band. And with the 75A-4 crystal calibrator, it gives even greater reset accuracy and accurate band-edge operation.

STABILITY

- An average of 24-hour stability of .003% or better is achieved under normal operating conditions.
- Precision ball-bearing construction allows single-knob, permeability tuning with rock-steady vibration stability.
- Each unit is hermetically sealed against atmospheric changes for life-long, drift-free operation.
- Each unit is individually temperature-compensated for minimum drift. Each is lubricated for life.

For more detailed information on Collins KWS-1 and 75A-4 visit or write the Collins distributor nearest you.

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

1955 Edison Award Offers Opportunity To Honor The Amateur Radio Service

ENTRIES for the 1955 Edison Radio Amateur Award close January 2. As in preceding years, the winner will receive the Edison trophy in a distinguished ceremony in a large metropolitan center, to which his expenses will be paid. A check for $500 will be presented to him in recognition of the public service he has rendered.

You can loyally serve the interests of a fellow amateur and the amateur service in general, by these steps:

1. Nominate an Award candidate yourself by letter. Address *Edison Award Committee, General Electric Company, Tube Department, Schenectady, N. Y.*
2. Discuss on the air with other operators what public service may have been rendered by an amateur you know. If your discussion reveals an Award candidate, follow with a nominating letter to the Award Committee.
3. Suggest that your local Radio Amateur Club review possible Edison Award candidates as an agenda item at the December meeting. Club nominations of candidates are welcomed.

Terms of the Award were given in full on this page in the September issue of this magazine. Please refer to these for your nominating letter. Extra copies of the rules are available on request from the Edison Award Committee.

Annually the Edison Award draws attention to the important work done by radio amateurs in the public interest. Winners W5PHP (1952), W9NZZ (1953), and W6VFT (1954) received wide TV, radio, and press recognition. Millions of people read about these amateurs and others who received special citations.

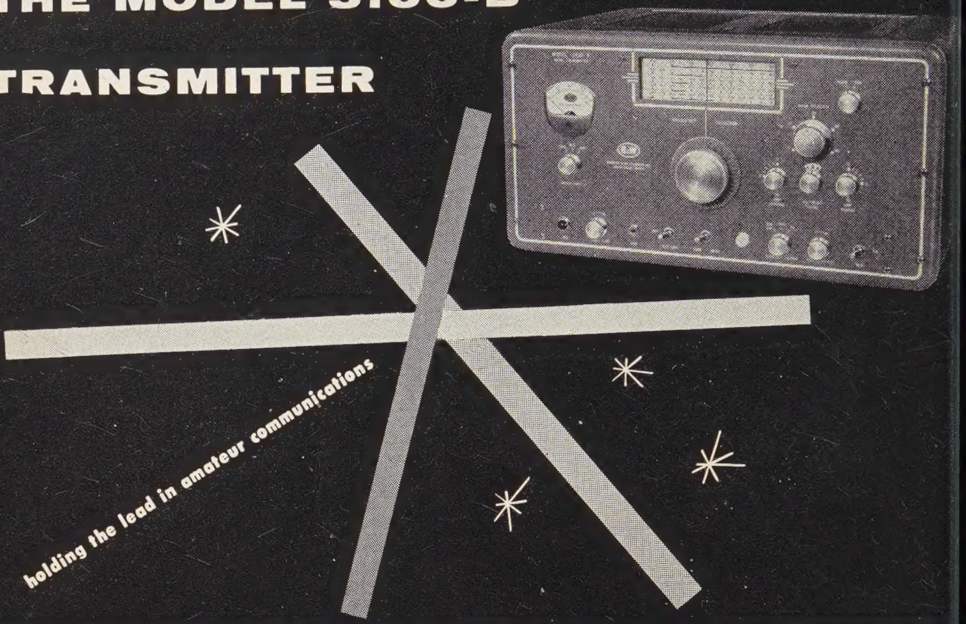
Pay tribute to all radio amateurs by helping select the 1955 Edison Award winner!

GENERAL ELECTRIC

166-1B7

Barker & Williamson Presents

THE MODEL 5100-B TRANSMITTER



holding the lead in amateur communications

The most outstanding feature of the new 5100-B transmitter is its *combination* of features. Unsurpassed performance on AM, CW, *and* SSB has been built into this one transmitter *without compromise.* Here, truly, is the transmitter of tomorrow . . . *today,* with:

- *high level AM telephony—push-to-talk*
- *clean CW keying—break-in on all bands*
- *superlative SSB — combined with the new 51SB-B*

Check *all* the features built into this fine transmitter. Write for literature, or see it at your distributor's. You may decide on the spot that the 5100-B is the transmitter of your dreams. *But you won't realize until you're on the air that words can't begin to describe the sparkling performance of this great transmitter.*

A FEW FEATURES OF THE 5100-B

Input power: 180 watts CW-SSB 140 watts AM phone
Frequency Control: Integral VFO or crystal
Operation: High level AM telephony—push-to-talk. Clean CW keying—break-in on all bands. Superlative SSB performance on all bands with the new 51SB-B generator
Controls: All controls on front panel. Fuse and high-low line voltage switch on rear chassis apron
Tuning: Ganged multiplier stage tuning
Styling: Handsome, distinctive blue-gray crackle cabinet. Semi-gloss gray silk-screened panel. Etched, machined aluminum knobs.
Coverage: 80-40-20-15-11-10 meters
Size: 22″ wide x 11½″ high x 14¾″ deep
Weight: 88 pounds

PLUS

Unitized construction . . . pi-network final . . . integra low pass filter . . . TVI suppressed

AMATEUR NET PRICE $475.00

SSB— a new companion unit to be released shortly . . . the Model 51SB-B Single Sideband Generator . . . can be inst easily in less than a half-hour. No conversion necessary. for complete details.

MAKE IT A MERRY CHRISTMAS . . . WITH THE 5100-B
SEE THE 5100-B AT YOUR B&W DEALER'S TODAY
or, write for literature.

B & W

BARKER & WILLIAMSON, INC.
237 Fairfield Avenue, Upper Darby, Pa.

CQ, The Radio Amateurs' Journal

December 1955
Vol. 11, No. 12

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New HEATHKIT DX-100 PHONE AND CW TRANSMITTER KIT

MODEL DX-100

Shpg. Wt. 120 lbs.

$189.50

Shipped motor freight unless otherwise specified. $50.00 deposit with C.O.D. orders.

- R.F. output 100 watts Phone, 125 watts CW.
- Built-in VFO, modulator, power supplies. Kit includes all components, tubes, cabinet and detailed construction manual.
- Crystal or VFO operation (crystals not included with kit).
- Pi network output, matches 50-600 ohms non-reactive load. Reduces harmonic output.
- Treated for TVI suppression by extensive shielding and filtering.
- Single knob bandswitching, 160 meters through 10 meters.
- Pre-punched chassis, well illustrated construction manual, high quality components used throughout—sturdy mechanical assembly.

This modern-design Transmitter has its own VFO and plate-modulator built in to provide CW or phone operation from 160 meters through 10 meters. It is TVI suppressed, with all incoming and out-going circuits filtered, plenty of shielding, and strong metal cabinet with interlocking seams. Uses pi network interstage and output coupling. R.F. output 100 watts phone, ... 125 watts CW. Switch-selection of VFO or 4 crystals (crystals not included).

Incorporates high quality features not expected at this price level. Copper plated chassis—wide-spaced tuning capacitors — excellent quality components throughout—illuminated VFO dial and meter face—remote socket for connection of external switch or control of an external antenna relay. Preformed wiring harness—concentric control shafts. Plenty of step-by-step instructions and pictorial diagrams.

All power supplies built-in. Covers 160, 80, 40, 20, 15, 11 and 10 meters with single-knob bandswitching. Panel meter reads Driver I_P Final I_G, I_P, and E_P, and Modulator I_P. Uses 6AU6 VFO, 12BY7 Xtal osc.-buffer, 5763 driver, and parallel 6146 final. 12AX7 speech amp., 12BY7 driver, push-pull 1625 modulators. Power supplies use 5V4 low voltage rect., 6AL5 bias rect., 0A2 VFO voltage reg., (2) 5R4GY hi voltage rect., and 6AQ5 clamp tube. R.F. output to coax. connector. Overall dimensions 20⅞" W x 13¾" H x 16" D.

Heathkit ANTENNA COUPLER KIT

Poor matching allows valuable communications energy to be lost. The Model AC-1 will properly match your low power transmitter to an end-fed long wire antenna. Also attenuates signals above 36 Mc, reducing TVI. 52 ohm coax. input—power up to 75 watts—10 through 80 meters—tapped inductor and variable condenser—neon RF indicator—copper plated chassis and high quality components.

MODEL AC-1

$14.50 Shpg. Wt. 4 lbs.

Heathkit GRID DIP METER KIT

MODEL GD-1B

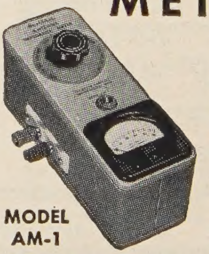
$19.50 Ship. Wt. 4 lbs.

The invaluable instrument for all Hams. Numerous applications such as pretuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L and Q of components—determining RF circuit resonant frequencies.

Covers 80, 40, 20, 11, 10, 6, 2, and 1¼ meter Ham bands. Complete frequency coverage from 2—250 Mc, using ready-wound plug-in coils provided with the kit. Accessory coil kit, Part 341-A at $3.00 extends low frequency range to 350 Kc. Dial correlation curves furnished.

Compact construction, one hand operation, AC transformer operated, variable sensitivity control, thumb wheel drive, and direct reading calibrations. Precalibrated dial with additional blank dials for individual calibration. You'll like the ready convenience and smart appearance of this kit with its baked enamel panel and crackle finish cabinet.

Heathkit ANTENNA IMPEDANCE METER KIT



MODEL AM-1

$14.50 Shpg. Wt. 2 lbs.

Use the Model AM-1 in conjunction with a signal source for measuring antenna impedance, line matching purposes, adjustment of beam and mobile antennas, and to insure proper impedance match for optimum overall system operation. Will double, also, as a phone monitor or relative field strength indicator.

100 μa. meter employed. Covers the range from 0 to to 600 ohms. Cabinet is only 7" long, 2½" wide, and 3¼" deep. An instrument of many uses for the amateur.

HEATH COMPANY
A SUBSIDIARY OF DAYSTROM, INC.
BENTON HARBOR 12, MICHIGAN

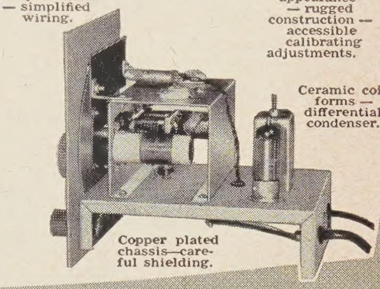
New *Heathkit* VFO KIT

MODEL VF-1

$19.50

Ship. Wt. 7 lbs.

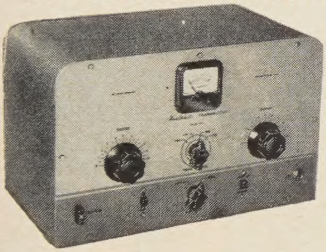
- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 10 Volt average output on fundamental frequencies.
- 7 Band calibration, 160 through 10 meters, from 3 basic oscillator frequencies.


Open layout,—easy to build—simplified wiring.
Smooth acting illuminated dial drive.
Clean appearance — rugged construction — accessible calibrating adjustments.
Ceramic coil forms — differential condenser.
Copper plated chassis—careful shielding.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at .45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard ½″ crystal holder. Construction is simple and wiring is easy.

Heathkit AMATEUR TRANSMITTER KIT



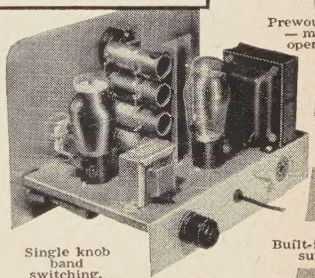
MODEL AT-1

$29.50

Ship. Wt. 16 lbs.

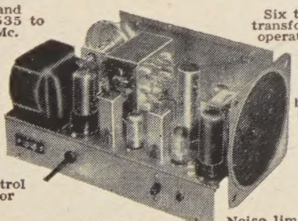
SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.
6AG7 ....Oscillator-multiplier.
6L6 ....Amplifier-doubler
5U4G .... Rectifier.
105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8⅛ inch high x 13⅛ inch wide x 7 inch deep.


Crystal or VFO excitation.
Prewound coils — metered operation.
Rugged, clean construction.
52 ohm coaxial output.
Single knob band switching.
Built-in power supply.

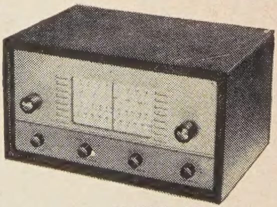
Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporaring many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

Heathkit COMMUNICATIONS RECEIVER KIT


Four band operation 535 to to 35 Mc.
Six tube transformer operation.
Stable BFO oscillator circuit.
Electrical bandspread and scale.
RF gain control with AVC or MVC.
5½ inch PM Speaker-Headphone Jack.
Noise limiter—standby switch.

SPECIFICATIONS:

Range..........535 Kc to 35 Mc
12BE6 ....Mixer-oscillator
12BA6 ....I. F. Amplifier
12AV6 Detector—AVC—audio
12BA6 ....B. F. O. oscillator
12A6........Beam power output
5Y3GT ....Rectifier
105 - 125 volts A.C. 50-60 cycles, 45 watts.



MODEL AR-2

$25.50

Ship. Wt. 12 lbs.

A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

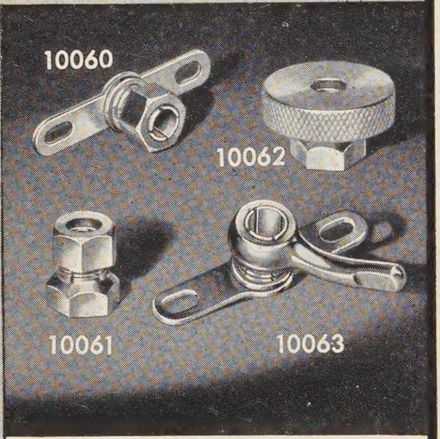
CABINET:

Proxylin impregnated fabric covered plywood cabinet. Shipg. weight 5 lbs. Number 91-10, $4.50.

HEATH COMPANY
BENTON HARBOR 12, MICHIGAN

Designed for

Application



SHAFT LOCKS

In addition to the original No. 10060 and No. 10061 "DESIGNED FOR APPLICATION" shaft locks, we can also furnish such variations as the No. 10062 and No. 10063 for easy thumb operation as illustrated above. All types are available in bright nickel finish to meet Signal Corps requirements or black oxide to meet Navy specifications.

JAMES MILLEN
MFG. CO., INC.

MAIN OFFICE AND FACTORY
MALDEN
MASSACHUSETTS

Feenix, Ari

Deer Hon. Ed:

Scratchi are just having most sobe eggspearyance. In fackly, a very stra eggspearyance. I are not knowing just v to making out of it. Seeing what you thinking, Hon. Ed.

Last nite, Xmas eve, Scratchi are fee pretty low. The hole idea of Xmas not c getting across to me. Oh, I trying the "p on earth, good will to men" routine, but I not having much luck. My speerits so that I not even feeling like worrying a Xmas.

You seeing, everything going wr Scratchi's XYL-to-be, Lil Watanabe, are in town on acct. she having sick sister in C fornia. So, not having her company for X Also, Hon. Brother Itchi are off on trip tr to selling our cattle and getting good price them. Not that he hoping to do to well beef prices not what they used to be.

You seeing why I feeling low? What Xmas without Hon. Brother Itchi? Scra will being all alone tomorrow. All alone Dec. 25. What a sityouayshun.

So, last nite I walking amelessly into r shack—and this are reminding me of and trubble I having. Scratchi's reseever are its last legs. When I turning it on I never if it going to working or not. At this poi not partickyoularly wanting to have rago on air, but what else can I doing when ar alone on Xmas eve?

I pulling up chair, sitting down, turnin xmitter filaments, then crossing Hon. Fir and turning on reseever. By gollies, pilot on reseever are coming on anyway. I tu across band, and it seeming to be ded. Is reely ded, or is reseever giving up the g

Scratchi figuring only one thing to calling seek-you. Grabbing mike and sen out haff-harted one minutes seek-you. Tur off rig, and without even touching rese dial, I heer some nice gentlefellow calling

I going right back to him, suddenly gladly to having somebuddies to talk

[*Continued on page 10*]

MERRY CHRISTMAS

BILL PETERSEN, W0JRY

PETERSEN RADIO COMPANY, Inc.

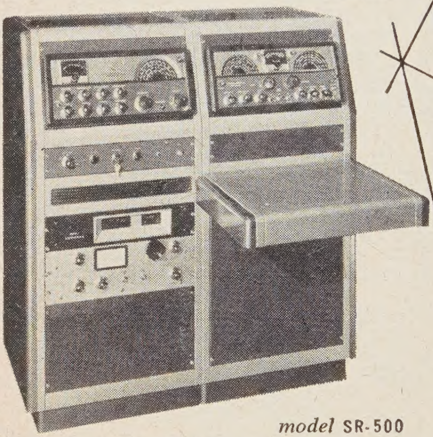
2800 WEST BROADWAY, COUNCIL BLUFFS, IOWA

PROFESSIONAL EFFICIENCY

For the first time
commercial broadcast styling in one
COMPLETE AMATEUR RADIO STATION

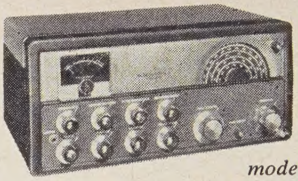
hallicrafters

model SR-500



model **SR-500**

A completely contained unit in a handsome console cabinet—transmitter/exciter, linear power amplifier, receiver—affording the finest in V.F.O. or crystal. SSB, AM and CW transmission and reception. You need supply only the antenna, microphone and AC power. All the wiring is complete, and external connections are provided for antennae and microphone. The transmitting and receiving units are located for maximum efficiency in coordinated operation. A special communications speaker is positioned above the operating shelf directly in front of the operator. Console is mounted on casters and is easily expandable. Three blank panels provided in the basic cabinet for installation of any additional equipment desired. All safety and protective features incorporated. Completely enclosed, fused with the main power relay controlled by a key lock. Entire back of cabinet is enclosed and perforated for maximum ventilation and heat dissipation. $1495.00

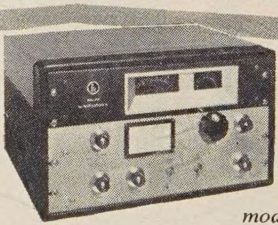


model **HT-30**
transmitter/exciter

Built in V.F.O. reads directly in kilocycles. V.F.O. stability is equal to most crystals—.009%. There are also provisions for 1 crystal for fixed frequency operation. Selective filter system is same used by commercial communications companies for reliable sideband selection to assure continued suppression of unwanted side band energy (down 40 db or more) and distortion products. New 50 db range meter for constant monitoring of r-f output and carrier suppression. Voice control system built in with adjustable delay and anti-trip features. Front panel controls allow selection of AM, CW, and upper or lower side band. $495.00

model **SX-100**
receiver

"Tee-Notch" Filter provides a stable non-regenerative system for the rejection of unwanted heterodyne in SSB. The "Tee-Notch" also produces an effective steepening of the already excellent 50 mc i-f pass band (made famous in the SX-96). Upper or lower side band selectable by front panel switch. Notch depth control for maximum null adjustment • Antenna trimmer • Plug-in laboratory type evacuated 100 kc quartz crystal calibrator—included in price • Second conversion oscillator crystal controlled—greater stability through crystal control and additional temperature compensation of high frequency oscillator circuits. $295.00

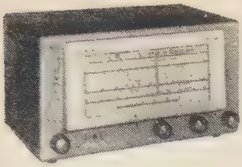


model **HT-31**
linear power amplifier

Continuous frequency coverage from 3.5 mc to 30 mc • Pi-network output for efficient harmonic and T.V.I. suppression • Major T.V.I. suppression built in • Does not require an antenna tuner as will feed loads from 50 to 600 ohms • Full metering of all important circuits, including input in watts • Employs two 811-A zero bias triodes in parallel. The input system is designed to be fed from a 50-70 ohm unbalanced line and requires a maximum of 10 watts drive on 80 meters. The grid tank circuit is balanced to provide all band neutralization. $395.00

hallicrafters

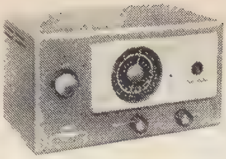
4401 W. Fifth Avenue • Chicago 24, Ill.



MODEL S-38D
$49.95

COVERAGE: Standard Broadcast from 540-1650 kc plus international reception on 3 Short-Wave Bands covering 1650 kc—32 Mc.

The radioman's idea of radio . . . This famous Hallicrafters' radio, now with smart new styling, amazes even the experts with its superior performance. Featuring the same skillful engineering found in much higher priced communications sets make the S-38D ideal for the Short-Wave listener or new radio amateur.



MODEL S-94 or S-95
$59.95

COVERAGE: S-94: 30-50 Mc—S-95: 152-173 Mc

For the thrill of emergency radio—Police, Fire . . . Two new high performance receivers replacing the popular Hallicrafters S-81 and S-82. Compact, easy-to-operate and covers police, fire, taxicab, bus, railroad, private telephone mobile, forestry and other industrial and emergency-service communications operating within models' frequencies. Newly engineered FM chassis provides low frequency drift and high signal-to-noise ratio.

for hams • novices • short wave listeners...

MODEL S-53A
$89.95

COVERAGE: Standard Broadcast from 540-1630 kc plus four Short-Wave bands over 2.5—31 and 48—54.5 Mc.

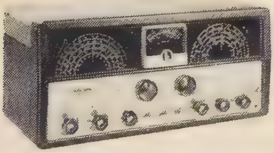
FEATURES: Large easy-to-read overseas dial with international stations clearly marked. Electrical bandspread and logging scale. Five inch built-in PM speaker, jacks for headphones plus phonograph jack. Temperature compensated to reduce fading due to frequency shift. Two stages of i.f.

MODEL S-85 or S-86
$119.95

COVERAGE: Broadcast band 540-1680 kc plus three S/W bands 1680 kc—34 Mc.

This newly engineered Hallicrafters receiver has the 10, 11, 15, 20, 40 and 80 meter amateur bands calibrated on large easy-to-read dial. Over 1000° of calibrated bandspread for better selectivity on ham bands. Husky, full sized unit features separate bandspread tuning condenser and built-in PM 5″ speaker.

world wide enjoyment
is yours with hallicrafters
...at everybody's price!



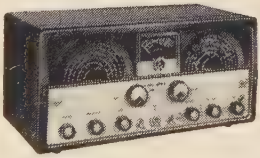
MODEL SX-96
$249.95
Matching R-46B
Speaker $17.95

COVERAGE: Standard Broadcast; 538-1580 kc; Three S/W Bands, 1720 kc-34 Mc. Band 1: 538 kc-1580 kc—Band 2: 1720 kc-4.9 Mc—Band 3: 4.6 Mc-13 Mc—Band 4: 12 Mc-34 Mc.

TYPE OF SIGNALS: AM-CW-SSB

FEATURES: Precision gear drives are used on both main tuning and band spread dials.

Most talked about receiver on the air . . . This Hallicrafters double conversion selectable side band receiver offers major improvements in stability by the addition of temperature compensation in the high frequency oscillator circuits and the use of crystal controlled second conversion oscillators. Hallicrafters highly selectable 50 kc i-f system is used in this new precision-built receiver.



MODEL SX-99
$149.95
Matching R-46B
Speaker $17.95

COVERAGE: Broadcast Band 540-1680 kc plus three Short-Wave Bands covers 1680 kc-34 Mc. Packed with all the features most in demand by the DX enthusiast, this model is a real stand-out in its price range. The large, very easy to read dial features over 1000 degrees of calibrated bandspread through the 10, 11, 15, 20, 40 and 80 meter amateur bands. Incorporated in the advanced design are such much-wanted components as an "S" meter, a separate bandspread tuning condenser, a crystal filter and an antenna trimmer. Grey-black steel and brushed chrome cabinet is perfectly styled for appearance and function.

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City .... State ......

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Scratchi telling him how happy I are to heering him so well on acct. my reseever a on the bum. He saying he never having trubb getting thru to peeples if they reely wantin to talk to him.

Hon. Ed., he reely having 1/c signal. It n sounding like most signals, tho. You knowin how fone signal sounding when using crist filter on reseever? How it are strong yet kind ringy? That are what his signal sound like. also seeming to have funny hollow effeck.

Not knowing if I hooking up with some re dee-x, on acct. never before heering prefix h using, I asking him what country he in. H telling me, and getting this, Hon. Ed., he tellin me he living in Ecalpyreve. That's rite, Ho Ed. I riting it down just the way it soundin

He also asking me how things are with m So, still feeling down in dumps, Scratchi tellin him about trubbles—no gal friend or brothe just all alone for Xmas. Then, rememberin I not asking his handle, I doing so.

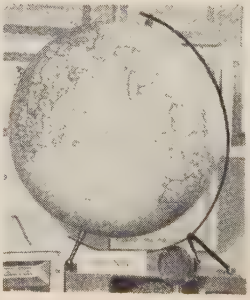
He coming back and saying that Scratchi trubbles not sounding very big to him. I fackly, he saying, how do I knowing for su that I will be alone on Xmas. Just about the his signal are starting to fade and fade, bu just before it fading out cumpleetly, I heerin him say, "Oh, you asked for my handl Scratchi, my name is legion."

About this time I are kinda mixed up b cause of this strange QSO, but are feeling som better, so going to bed. This morning, abou 10 ayems, are waking up when somebuddies a jiggling my sholder. Hon. Ed., it were Ho Brother Itchi!! Home for Xmas!!

He telling me to getting up and having brek fust. I dressing like furies, and as going b Xmas tree on way to dining room, I seeing bran new reseever under the tree. Hokendok A present from Itchi. He getting good pric for cattle he selling! Boy oh boys. Are n sooner thanking Itchi, than who walking front door but Lil, my XYL-to-be. By gollie Xmas are cumpleet.

Now, tonite, Xmas nite, Scratchi are thin ing things over. I can't getting that Xmas ev QSO out of my mind. You know that count he say he from—Ecalpyreve? If you spelling backwards, it reeding Everyplace. And wh did he meen when saying his name is legio Hon. Ed., you think he pulling my leg . . . not?

Happy Yooltide to Everyone,
Hashafisti Scratchi



Holy Smokes! You seeing new CQ World Globe yet? (looking to page 6

Season's Greetings

FOR THIS AND MANY MANY SEASONS TO COME . . . *with the*

GPR 90

COMMUNICATION RECEIVER

To all of you, from all of us . . . . Hearty Thanks for your overwhelming response.

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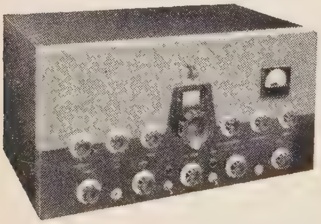
JOHNSON AMATEUR EQUIPMENT

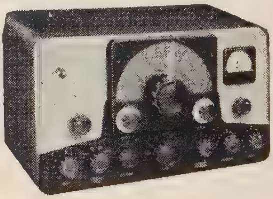
Designed and built by radio amateurs, Johnson Amateur Equipment is your best buy. Packed with features . . . this complete line of transmitting equipment and accessories reflects imaginative engineering as well as budget-conscious pricing. For detailed information on the products listed below or on other popular Johnson amateur products, write for your copy of Catalog 955 . . . yours on request.



VIKING II TRANSMITTER

180 watts CW input . . . 130 watts phone. Bandswitching on all amateur bands from 10 through 160 meters—effectively TVI suppressed—completely self-contained. Available as a kit or completely wired and tested.

Cat. No.		Amateur Net
240-102-1	Viking II Transmitter Kit, with tubes, less crystals, key, and mike	**$279.50**
240-102-2	Viking II Transmitter, wired and tested	**337.00**



VIKING "RANGER" TRANSMITTER

75 watts CW input . . . 65 watts phone. All amateur bands from 10 through 160 meters. TVI suppressed—built-in VFO or may be crystal controlled. Timed sequence (break-in) keying system. Available as a kit or completely wired and tested.

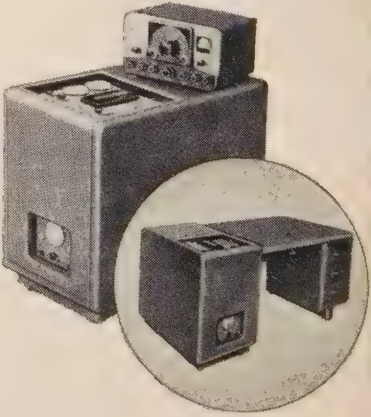
Cat. No.		Amateur Net
240-161-1	Viking "Ranger" Kit, with tubes, less crystals, key, and mike	**$214.50**
240-161-2	Viking "Ranger", wired and tested	**293.00**

VIKING KILOWATT POWER AMPLIFIER

1000 watts AM, CW, or SSB. Boldly styled . . . contains every conceivable feature for safety, operating convenience, and peak performance.

Cat. No. 240-1000 Viking Kilowatt Power Amplifier—wired, tested, complete with tubes. . . . . **Amateur Net $1595.00**

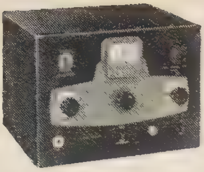
Cat. No. 251-101-1 Matching Accessory Desk Top and three drawer pedestal. . . . . **FOB Corry, Pa. $123.50**



VIKING KILOWATT "MATCHBOX"

Bandswitching—completely self-contained. Covers 80 through 10 meter amateur bands. Fully shielded—performs transmission line matching and switching functions at the kilowatt level.

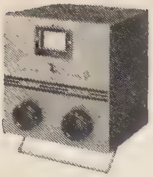
Cat. No. 250-30 Kilowatt "Matchbox", assembled, wired, and tested. . . . . **Amateur Net $124.50**



VIKING "ADVENTURER" CW KIT

Compact, completely self-contained 50 watt transmitter kit. Single knob bandswitching—effectively TVI suppressed. Easy assembly by novice or experienced amateur. 80, 40, 20, 15, and 11-10 meters.

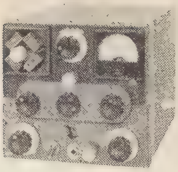
Cat. No. 240-181-1 Viking "Adventurer" Kit complete with tubes, less crystals and key. . . . **Amateur Net $54.95**



VIKING VFO KIT

Variable frequency oscillator with 160 and 40 meter output for frequency multiplying transmitters. Accurately calibrated 160 through 10 meters. Available as a kit or wired and tested.

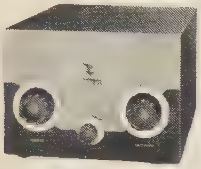
Cat. No.		Amateur Net
240-122-1	Viking VFO Kit, with tubes.	**$45.50**
240-122-2	Viking VFO Kit, wired and tested. .	**69.75**



VIKING MOBILE TRANSMITTER

Power-packed . . . rated 60 watts maximum PA input. Bandswitching 75, 40, 20, 15, and 11-10 meters. Under-dash mounting. Controls readily accessible. Available as a kit or wired and tested.

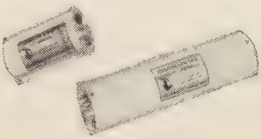
Cat. No.		Amateur Net
240-141-1	Viking Mobile Transmitter Kit, less tubes.	**$99.50**
240-141-2	Viking Mobile Transmitter, wired and tested, less tubes —available on special order.	



VIKING 250 Watt "MATCHBOX"

Performs all loading and switching functions required in medium power stations. Fully shielded—covers 3.5 to 30 mc. Built-in transmit/receive relay.

Cat. No. 250-23 Viking 250 Watt "Matchbox", assembled, wired, and tested. . . . . **Amateur Net $49.85**



SWR BRIDGE

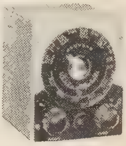
Provides accurate measurement of SWR for effective use of low pass filter and all antenna couplers.

Cat. No. 250-24. . . . . **$9.75**

LOW PASS RF FILTER

Handles more than 1000 watts RF—provides 75 db or more attenuation above 54 mc.

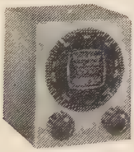
Cat. No. 250-20. . . . . **$13.50**



MOBILE VFO KIT

Drives any straight pentode crystal stage. Vernier dial calibrated 75, 40, 20, 15, and 11-10 meters. For steering post or under-dash mounting. Available as a kit or wired and tested.

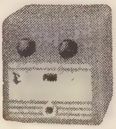
Cat. No.		Amateur Net
250-152-1	Viking Mobile VFO Kit, with all parts and cables, with tubes.	**$33.95**
250-152-2	Viking VFO Kit, wired and tested, with tubes. .	**49.95**



2 METER VFO

Exceptionally stable, temperature compensated, and voltage regulated. Designed to replace 8 mc crystals in frequency multiplying transmitters. Only 4" x 4½" x 5".

Cat. No.		Amateur Net
240-132-1	Viking 2 Meter VFO Kit with tubes and precalibrated dial. . . .	**$29.50**
240-132-2	Viking 2 Meter VFO wired, calibrated and tested—with tubes.	**46.50**



"SIGNAL SENTRY"

Monitors CW or phone signals without regard to operating frequency. Energized by transmitter RF. Serves as code practice oscillator with simple circuit modification.

Cat. No. 250-25 "Signal Sentry", wired and tested, with tubes. **Amateur Net $18.95**

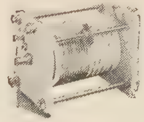
"WHIPLOAD—6"

Provides high efficiency base loading for mobile whips. Instant bandswitch selection of 75, 40, 20, 15, 11 and 10 meters. Fibreglass housing. Mounts on standard mobile whip.

Cat. No. 250-26 "Whipload-6" Antenna Loading Coil. **Amateur Net $19.50**

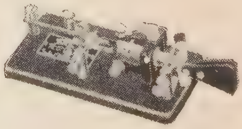
See your distributor

Johnson Amateur Equipment is sold only through Authorized Johnson Distributors—most offer convenient time payment plans. For complete information see your distributor.



AMATEUR INDUCTORS

Wide selection of popular inductor types available: High Power Variable • Rotary • Edgewise Wound "Hi-Q" • Swinging Link.



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Semi-automatic, high speed standard, heavy duty and practice keys. Code practice sets, cords and wedges for semi-automatic models.

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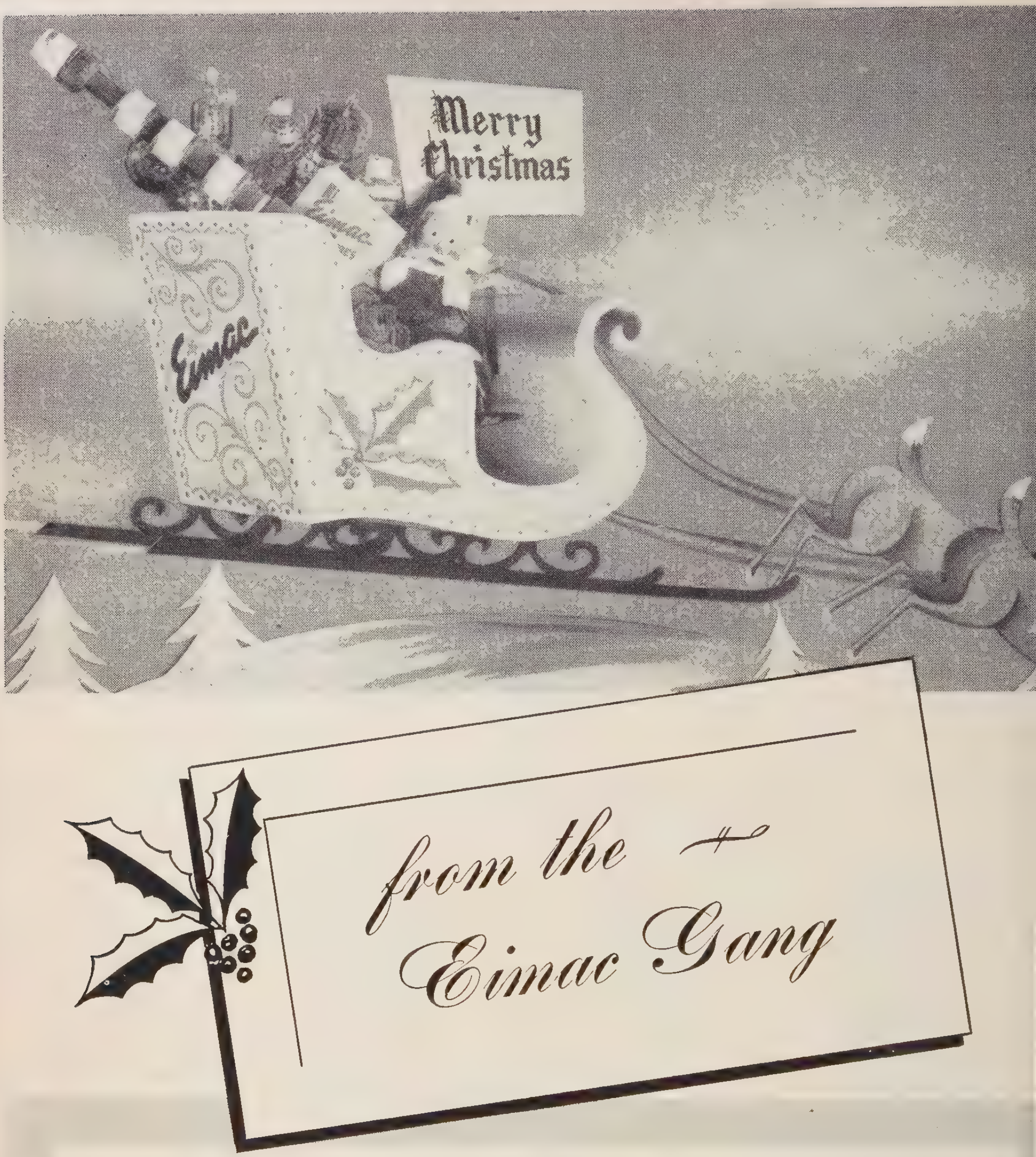

K6AFL
K6ANN
K6BAS
W6BAX
W6AY
K6BCM
W6BET
K6BJ
W6BMU
W6CBN
W6CEO
W6CHE
W6DDN
W6DJI
W6DUW
W6DVB
W6DWM
W6ETR
W6FBR
W6FKS
W6FYM
W6GJF
K6GPX
W6GVY
W6HB
W6HHN
W6HQN
W6INJ
W6IQO
W6JFV
W6JZ
W6KEV
W6KFQ
W6KM
W6LAD
KN6LLE
W6LOZ
W6MGO
W6MUC
W6NBD
W6NGP
KN6OAZ
W6ODT
W6OHU
W6OMC
W6OMD
W6OS
W6QIT
W6QQV
W6RWI
W6RXW
W6SC
W6SCZ
W6TVS
W6TXT
W6UF
W6UFU
W6UOV
W6UUR
W6VBJ
W6VQD
W6VW
W6VYH
W6WC
W6WSL
W6YSX
W6ZGV
W6ZLB
W6ZPH
W7SLC
WN7YWL
W1KKP
W2CN
W2QA
W4DLL
W4JNL
W4TO
W6ENV
W6JBC
W6QD
W7ESK
W9AIO
W9DZY
W0AZT
W0NWW
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EITEL-McCULLOUGH, INC. SAN BRUN
CALIFORN

..de W2NSD

NEVER SAY DIE

Back in 1946, when two meters was opened up I got on the band with a 522, one of the first to use this venerable rig. Those were the days of modulated oscillators and superregenerative receivers. W2NYC and I built some push-pull 6C4 long lines oscillators with grid modulation for our cars and mobiled all around the city having a grand time with them. We even tried them on top of Mount Washington, N.H. with a sixteen element homemade beam, but had so much QRM from the FM transmitter nearby that the superregen receiver couldn't pull anyone through. Two meters did get quite a play in those days though and we had a lot of enjoyment. Even in the small towns fellows were getting on the band. W1MCS and I established the first two meter contact from Littleton to Bethlehem, N.H., a record that seems somehow to have gotten misplaced in the annals of ham radio.

It is a well known axiom in life that it takes just a bit of extra effort to be successful. This holds for ham radio too. The two meter man that takes the trouble to put up a good beam and build a reasonably stable and sensitive receiver usually has enough contacts to keep him interested in the band. The rest of us use makeshift gear and after a while lose interest when we have to wait for days or weeks between contacts.

In 1947 I got together a small group and headed for Mt. Greylock in Massachusetts with a 522 and a sixteen element beam. This expedition worked out well and was repeated. We worked all over Massachusetts and down into Maine, N.H., Connecticut and New York.

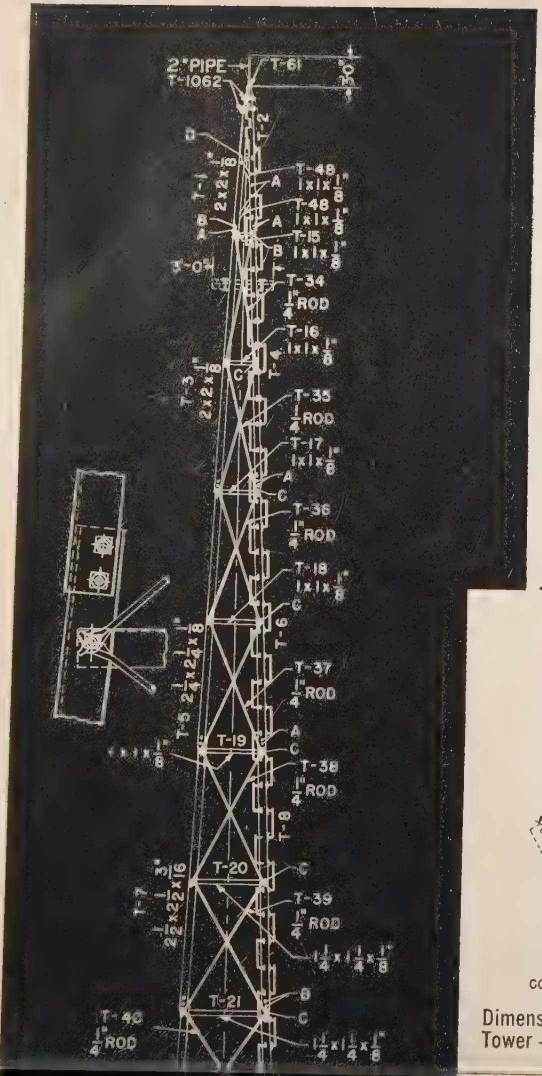
In 1948 I set up shop on top of the News building in New York, 37 floors up, and ran the same old 522. Fixed beams pointing northeast and southwest brought QSO's from 100 miles around during closed band conditions. Somehow, once you try high altitude operating you never get over the bug for even with low power you can really work out. During the September VHF Contest that year I managed to work 11 sections on two meters with only five watts output.

Since then two meters has had its ups and downs with occasional bursts of operation from the top of the Municipal Building in New York and from the top of the Guggenheim Museum, both of these last primarily for RTTY operation. Jim and I planned a short trip to New Hampshire over the Labor Day weekend this year and decided to take along a Gonset Communicator and include Mt. Washington in our travels. I called everyone I could think of that might have a Communicator available and finally managed to borrow one from John Sutter, W2MHM, proprietor of one of the largest boatyards around here. I tried the unit out in the livingroom just before leaving for N.H. and found that it did a terrific job even with the whip antenna.

Jim and I made the summit shortly after noon on Sunday and carried the equipment to a spot among the rocks on the highest point. A visit to the TV station with a line cord and reel of wire brought us power. We had just set up a groundplane antenna and started to

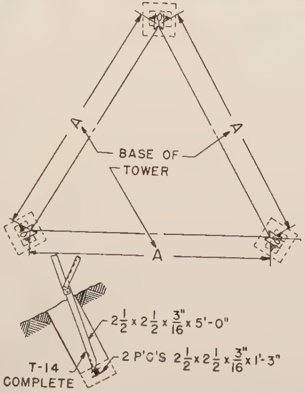
W2NSD/1 Atop Mt. Mansfield near Burlington Vermont. Six element two meter beam and collapsible 20-foot mast are at the left of the car. It was cold and foggy, but contacts near 200 miles were made with the Gonset Communicator from this 4000-foot peak.

[*Continued on page 98*]



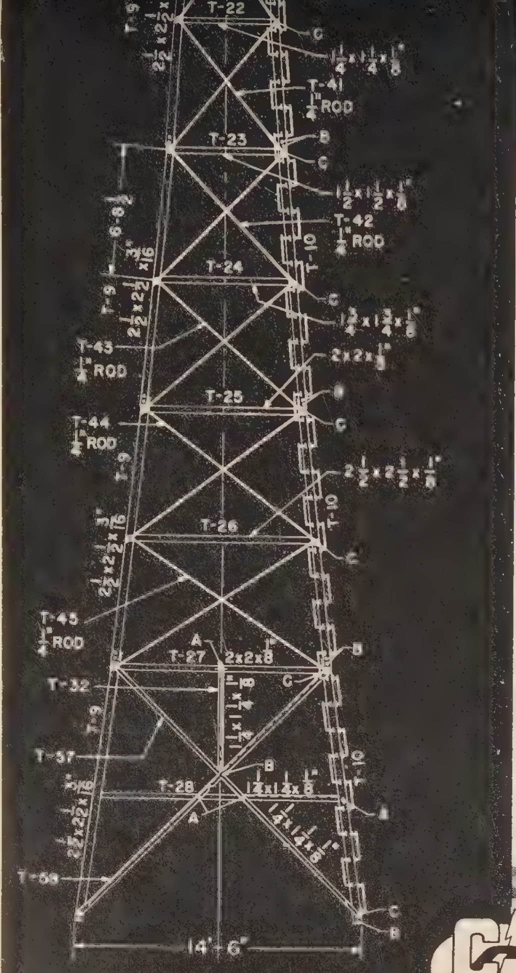
SKY-TOP ANTENNA TOWERS

—FROM COMMUNICATION HEADQUARTERS*


BASE OF TOWER
A
A
A
2 1/2 x 2 1/2 x 3/16" x 5'-0"
2 P'C'S 2 1/2 x 2 1/2 x 3/16" x 1'-3"
T-14 COMPLETE

Dimension A: 60 ft. Tower — 6' 1/8"; 87 ft. Tower — 11' 1 1/16"; 100 ft. Tower — 14' 6"

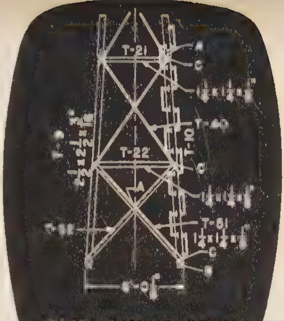
- **Completely self-supporting — no guy wires needed**
- **Simple in design for quick, easy erection**
- **Heavily galvanized after fabrication**
- **Loop steps on corner posts form solid ladder**
- **Triangular construction**
- **Trim, streamline appearance**



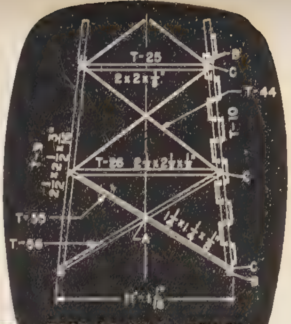
BASE OF 100 FT. TOWER
Cat. No. 270-509

Towers 60, 87 and 100 ft. high

IMMEDIATELY AVAILABLE!



BASE OF 60 FT. TOWER
Cat. No. 250-509



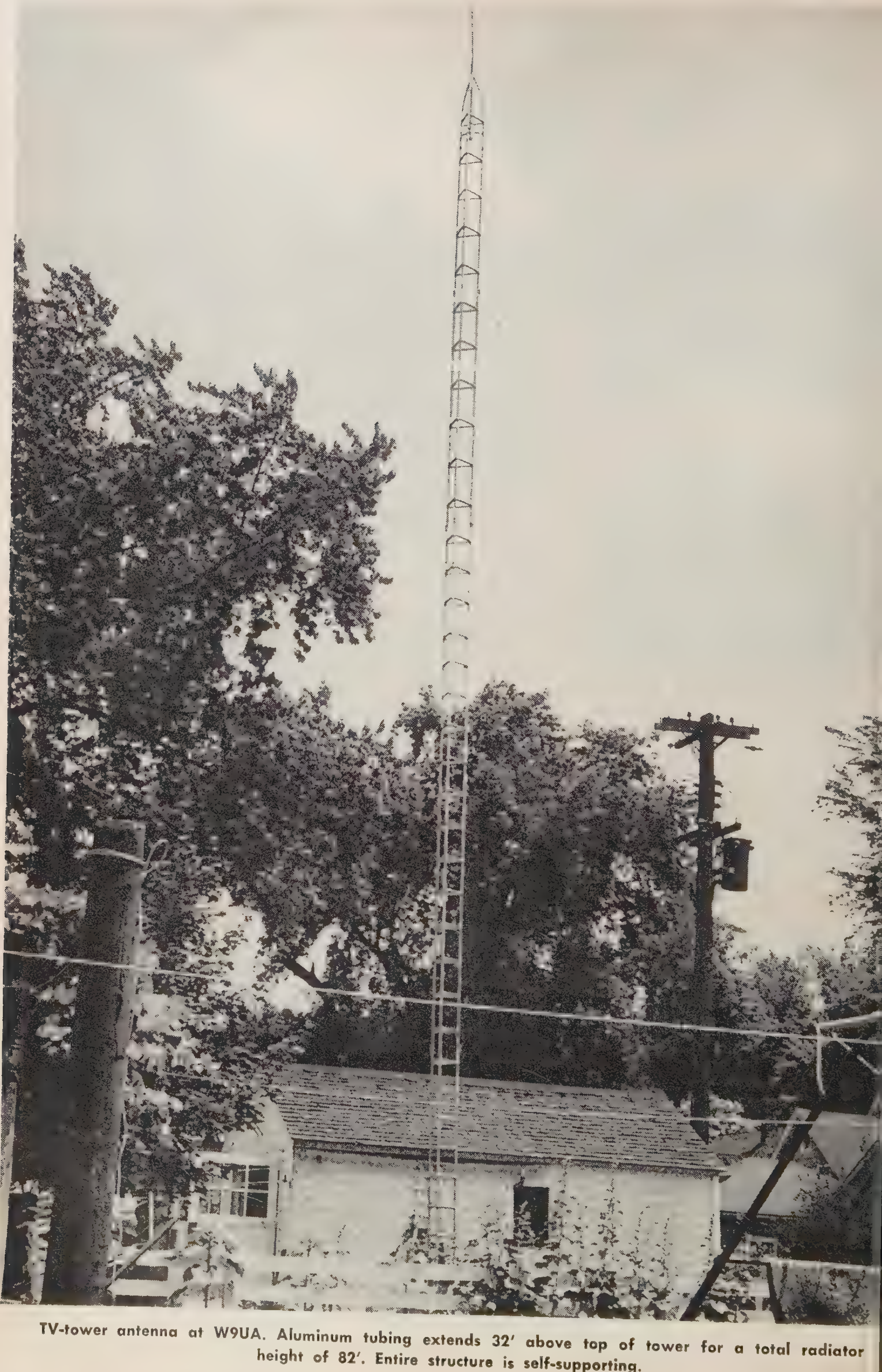
BASE OF 87 FT. TOWER
Cat. No. 260-509

These new SKY-TOP towers have countless uses in the communication fields. Their design is such that they may be assembled by non-skilled, inexperienced personnel at low cost. SKY-TOP towers, completely galvanized after fabrication, will render many years of service without further protection. They are capable of supporting antenna structures having a projected cross-sectional area of 6 square feet, centered 3 feet above the tower top, in winds up to 85 mph. Order SKY-TOP towers in three popular sizes: 60, 87 and 100 ft. height.

For complete detailed catalog information, please request Catalog No. 56 on your company letterhead

***Communication Products Company, Inc.**

MARLBORO, NEW JERSEY — Telephone: FReehold 8-1880



TV-tower antenna at W9UA. Aluminum tubing extends 32′ above top of tower for a total radiator height of 82′. Entire structure is self-supporting.

Note typical horizontal obstacles in this typical ham back yard. Yet with this trusty vertical W9UA can expect 20 to 40 over 9 reports every time he gets on the air . . .

Guyless TV Tower as a Radiator

T. Wayne Wigton, W9UA
359 Seminary Ave.
Aurora, Illinois

A review of many fine articles in the Radio Journals describing a multiplicity of different types and configurations of antenna installations would at first thought, indicate that we have reached a point of saturation and there would be no further reason to waste time reading about another design. However, you will agree, antenna systems are many and varied and there is no other single topic in the field of radio so controversial and certainly none more interesting.

Perhaps we can conclude, by reasoning, the paramount requirement for an efficient radiation system might be dictated by each individual application, governed by such things as construction cost, radiation pattern desired, the available space and the prevailing operation requirements. Due to these and other problems that affect electrical and mechanical design we can, therefore, justify our study of all types and all articles describing antenna systems, keeping in mind the objective of gaining more information and ideas from each study that will prove to be important and allow us to "tailor fit" so to speak, a system that will best satisfy our own requirements and result in an outstanding signal on the amateur bands.

The antenna to be described is conventional insofar as electrical theory but has certain constructional features which may be helpful to those interested in planning and building a low cost, neat appearing and space saving, yet efficient radiation system for use on any of the amateur frequencies from 1.8 to 30 mc.

Mechanical Construction

The overall height above insulators was chosen to be an actual 82 feet and 2 inches. This height being governed by the decision to center the radiator frequency for optimum performance on 7200 kc. A height of 82′2″ resolves to be .63 wavelength at this frequency and will produce maximum radiation of energy at an extreme low vertical angle.

Ingenuity is most important in planning and building a mounting foundation with sufficient mass and depth to enable a structure of this kind to withstand wind stresses. At the outset it was decided no unsightly guy wires would be used. This was of further importance due to the available back yard space being only 40 feet wide and 60 feet long and most of this area being occupied by flower gardens and a garage. A solid concrete base, reinforced by scrap steel, 20 inches in diameter and 6 feet in depth was provided.

The antenna consists of a standard 50 foot triangular shaped TV tower. Mounted on top of it is 36 feet of 61-ST aluminum tubing pinned and telescoped together extending 32 feet 2 inches above. To insure low DC resistance and not to depend on the mechanical joints between sections, three #9 solid copper wires were run vertically and bonded at frequent intervals along each tower leg. At top and bottom the three wires were terminated at a convenient point to become part of the radiator. TV towers are available in 10 foot sections with provisions for securely bolting each section together. In this case, the manufacturer (Kuehne) supplies a 5 foot, half length section intended to be sunk in the concrete thereby effecting a solid secure mounting to the tower base and with the exact hole spacing from corner to corner. The short five foot section extending 3 inches above the square concrete base is bolted to a triangular shaped piece of ¼ inch boiler plate measuring 16 inches on a side. The lower plate is hinged to a plate of same dimensions next above. Utilizing a hinge type mounting simplifies raising and lowering the tower, allowing complete assembly on the ground. The total weight of the assembled unit amounts to approximately 175 pounds. Due to the effective leverage of a stick this long it is necessary to construct the hinge mechanism mechanically oversize and rugged. The center to center leg spacing of the tower base is 11 inches.

"Doghouse" and base structure. Note raincoat.

The 16 inch triangular plates form what amounts to a three layer sandwich with the three porcelain insulators as the fill. The local blacksmith fabricated the three plates and hinged the lower two together using a ½ inch brass rod as the hinge axle. A word of caution concerning the three stand-off supporting insulators. During the raising ceremony, we unknowingly damaged one of the insulators by separating the porcelain from the steel base. After the tower was in place this was discovered and an immediate correction was necessary. This was accomplished without the necessity of lowering the unit again and will be described later in this article. The reason for failure of the insulator was most likely due to improper application since they were purchased as army surplus material and although being jumbo sized so far as standoff insulators go, their design was most likely intended for downward thrust instead of an application such as this where, particularly during raising, reverse strain was applied causing it to pull apart.

The third piece of boiler plate is bolted to the upper flanges of the insulators, thence to the tower legs proper. Again a word of precaution; it must be remembered that the leverage at the tower base reaches a point of almost irresistible force during high winds. For this reason the design of such a mount must utilize bolts large enough to withstand a "beating" and must be made accordingly rugged and sturdy.

Original plans provided for the tower to b anchored dependent only on the three stand off insulators for vertical and horizontal thrus As mentioned before during the process o erecting one of the insulators was pulled a littl loose from its mounting base but this was no discovered until the ropes had been remove To get around lowering it again it was decide to use six pieces of 2 inch channel iron, bolt and formica insulating material to form th jaws of a "jumbo" clamp. The photo of th tower base illustrates the end result whic amounts to the sandwich (as referred to before being clamped together but maintaining insulation between base and radiator proper. Thi scheme, though accidental, proved to be valuable asset, providing more rigidity to th base mount than otherwise would have bee accomplished by the original design.

At each corner of the triangular base plate it will be noted that standard #7 screw typ machinist's jacks, insulated from ground b formica blocks, are used for the purpose o leveling and plumbing the tower and serve a a micrometer adjustment for this purpose. Thi mounting has held without failure thus far i actual measured peak winds of 70 mph.

Tuning Box

A point of importance to the successfu operation of any radiation system is the efficien transfer of power from the transmitter to th antenna feed point. This can be accomplishe by numerous methods such as using open wir line, twin line or coaxial cable. In view of th ever-present TVI problem, it was decided ther was an advantage to the use of buried co-a and to terminate its 52 ohm impedance in a "L" network. This not only serves to matc the transmission line to the varying antenn impedance, (changing from band to band) bu also provides further attenuation of harmoni radiation because of its inherent low pas filter action.

In the photograph of the antenna tuner yo will see the B&W 3852 variable inductor use in place of the usual switch and separate coi combination. This proved to be very successfu and contributed to the simplicity of construction of the tuning unit. A Johnson number 116 208-4 counter dial indicates the exact rolle position on the coil allowing calibrations o tuning to be made. Recording of exact adjust

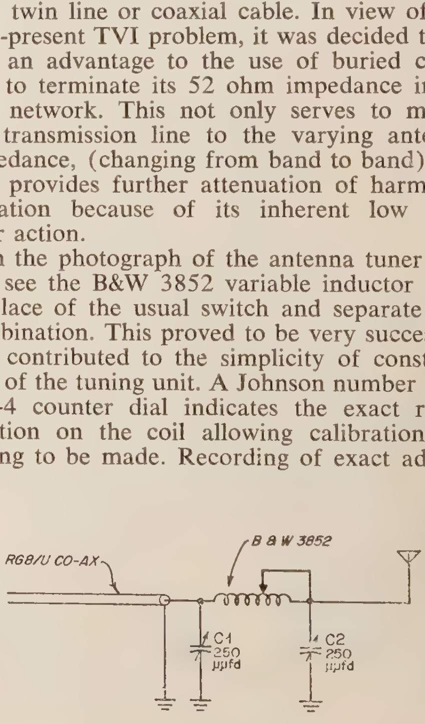


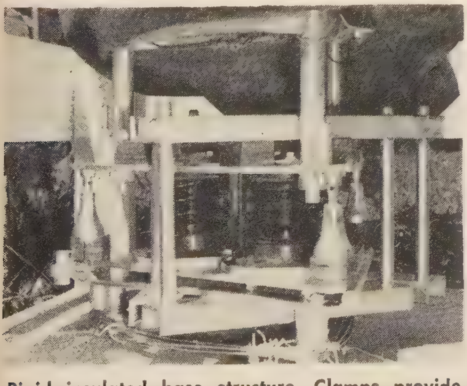
Fig. 1. "Doghouse" circuit.

ments are logged for rapid re-setting when changing bands.

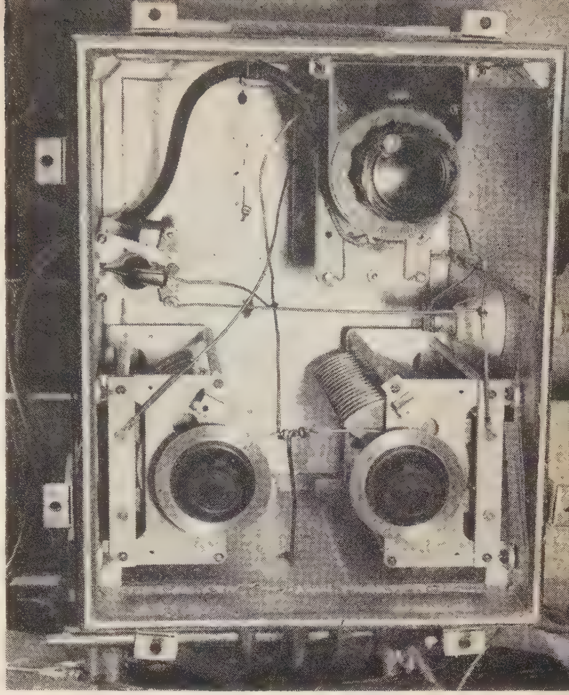
It will be noted in the schematic diagram of Fig. 1 that no fixed capacitors are used. Maximum capacity necessary on any band is 500 uuf, and this occurring on the lower frequencies. Peak r-f voltage on any band is relatively low so that it is feasible to employ low voltage receiving-type variable capacitors readily available from surplus at low cost. The use of variable capacitors allows setting of necessary capacity without complicated switching arrangements otherwise necessary when using fixed capacitors. Air dielectric condenser ratings are dependent on voltage and the current is not a limiting factor. Mica capacitors, however, have definite limitations insofar as current is concerned depending of course on the frequency of operation and the capacity of the condenser. It was first decided to employ 500 uuf 20 KV TV type capacitors in a series parallel combination for tuning the circuit but with 1 KW input these units became hot and the effective capacity was materially changed beyond the point of usefulness. There are of course fixed capacitors available which will satisfy both current and voltage requirements but the cost of these units far out-weighs the necessity.

A one-to-one standing wave ratio is obtainable on all amateur bands by tuning the "L" network and increasing or decreasing inductance or capacitance, depending on the reactance at the base of the antenna. In the first tests made in the alignment the resistance and reactance values were determined by the use of an r-f bridge, but this method is not essential. Accurate matching can be accomplished by the use of any of the readily available standing wave ratio indicators placed in the coaxial line and the tuning network adjusted to the values producing the lowest standing wave ratio.

Early experiments showed that the tuning network will perform properly when used in an all-wood enclosure only, due to the de-tuning effect otherwise created by the use of a metal housing.



Rigid insulated base structure. Clamps provide added strength, machinists jacks allow micrometer adjustment.



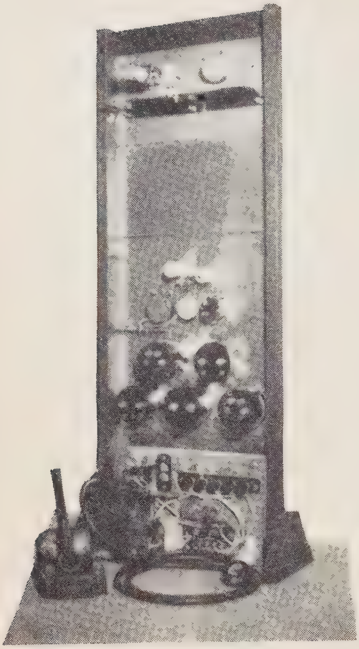
Open "doghouse," showing matching network. C1 and C2 are below, the B & W variable inductor above.

Importance of Ground System

A radiator, in this case a vertical tower, extending vertically in free space, will exhibit inductance with the same effect as that produced by wire wound in the form of a coil. In addition to the inductance there will be distributed capacity to all nearby conducting objects, particularly the ground. Both inductive reactance and capacitive reactance impede or resist the flow of current into the antenna. At resonance the inductive reactance is both equal and opposite to the capacity reactance, resulting in the limitation of desired current flow due to the resistance component. This unwanted resistance is made up of several combining components: transmission line resistance, dielectric losses from nearby power lines or metal objects approaching resonance, and (of great importance) the earth ground resistance. Ground resistance will vary depending upon the particular locale, but most generally its properties are not ideal and a compromise must be reached to bring about an improvement.

To improve this factor of high resistance we can provide a ground wire system buried just below the sod level. An effective installation of this type is neither expensive or difficult. The ground system should include as many radials as possible, forming an imaginary wagon wheel with the radial wires becoming the spokes. Radial lengths are not critical and can each vary from ¼ wavelength to one full wavelength

[*Continued on page 115*]



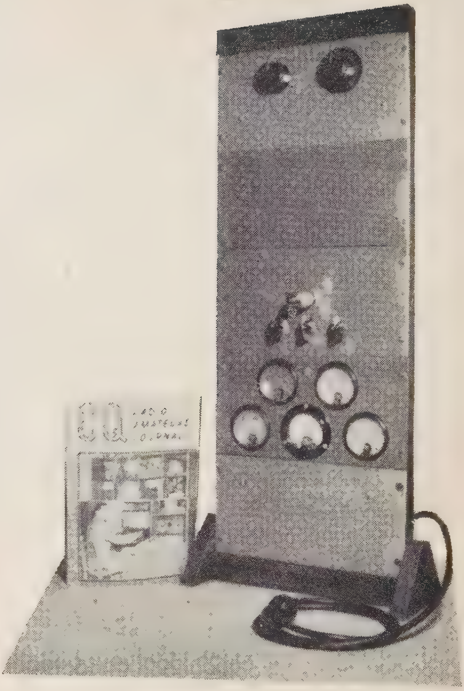


Table-Top Relay Racks

Harold Reed, W3EJP
3917 Madison St.
Hyattsville, Md.

Over a number of years of experimenting with radio electronics apparatus, the author has employed many different arrangements for the temporary assembling of parts, in testing out new circuits or in designing and building a new device, and proving its workability, prior to construction into permanent form.

Breadboards, bread pans, pie pans, cake pans, specially constructed chassis, etc., all offer certain advantages, but all have the annoying disadvantage of requiring too much space on the work table or bench, taking needed working space for tools, test equipment and books.

In doing some UHF experimentation, in which it was desired to build the equipment into small units so that these individual sectio
could be easily removed and variations of a
section of the layout connected in, without d
turbing the rest of the setup, the project end
up with an array of chassis covering the wo
table which could not be worked on easily a
proved to be quite inconvenient in the mat
of testing procedure.

About this time, an unintentional glance
the regular ham rig, built in its large relay ra
sparked an idea. On the table, as on the flo
why not build up, instead of out? The res
was the miniature table top rack, one of wh
is shown in the photographs. It is found v
convenient, when it is required to assemble
merous sections in an experimental undert

ing, to place several of these racks side by side. It will be observed that any individual part mounted on the panels can be easily changed or tested. Also, any complete panel may be removed and another readily slipped into place.

The physical size of the table top rack will be dictated by the type of experimental work in progress. As they are simply and quickly constructed, and cost practically nothing, several sizes may be built. The miniature one described here is for UHF and transistor work, as well as other projects employing small, lightweight components.

Figure 1 gives details of the dimensions and construction of the rack. Any available scrap wood on hand can be made use of. The author's racks are constructed of odd pieces of California redwood. The framework is fastened together with small nails and was then given a coat of oil stain. It may appear at first glance that the rack would be easily upset, but this is not so due to the shape of the small base pieces attached to the bottom and sides of each vertical standard. It is advisable, of course, to mount heavy component parts near the base, such as the rectifier with the filament transformer as shown in the photograph with this article.

Figure 1 also gives dimensions of the panels. These panels are cut from used 16″ aluminum recording discs, obtainable from radio broadcasting stations and recording studios. This soft, thin aluminum is quite easily cut with tin shears and due to its easy workability, component parts need not be mounted all at one time, but can be added as required. The panels are attached to the rack with ½″, #4, round head wood screws, with small washers under the heads. By always using these same size screws no difficulty is experienced, after numerous changing of panels, with the screws not drawing up slugly. Even if they did not screw up tight a small wooden plug inserted in the screw hole would remedy the condition. Cutting the panels can best be done by marking off the size with a pencil, scoring these markings with an awl, and then cutting with the tin snips. The acetate coating on the aluminum discs is easily removed by a brief soaking in scalding hot water. It then comes off as easily as peeling a banana. Panels can be quickly interchanged if care is taken to observe the same measurements for all screw holes.

Starting at the bottom of the rack shown in the pictures accompanying this article may be seen a dual selenium rectifier unit which was used in an experimental project requiring a B positive and two B negative supply voltages as well as 6.3 a.c. filament voltage. Above the rectifier unit is a meter panel. In some work, where short leads are mandatory, the required meters can be easily removed from the meter panel and placed directly in the panel of the circuit being tested. Meter holes can be cut in the thin aluminum with little effort.

Next is a panel containing some of the component parts of a Conelrad monitoring project. The wiring and some of the parts have already been removed. This temporary panel developed into a Conelrad alert device which is now in operation, in permanent form in two radio stations. Also, it was the basis for an article on the subject for Radio-Electronics magazine.

A blank panel is next in line, ready for whatever need may arise, followed by the top panel which is in the first stages of a new undertaking, some of the parts having already been placed in position. The small shelf attached to the panel is also made from a piece of aluminum recording disc. Small shielding baffles and boxes can likewise be quickly formed from this same material.

The table top relay rack is certainly a convenient way to assemble, temporarily, parts of an unknown or untried circuit. It helps to eliminate haywire, makes parts changing easy and provides for rapid testing procedures. These advantages will be realized by the builder with the initial use of these little racks.

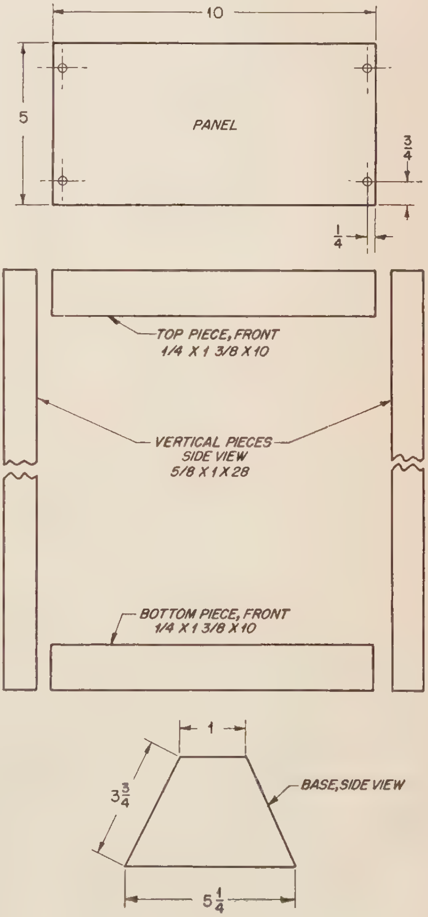


Fig. 1. Midget Rack details.

DX YLs

WAC/YL

No sooner had the June '55 issue of *CQ* come out, publicizing all the awards available from YLRL, than ZL1BY sent in his application for WAC/YL. With all cards in order, WAC/YL certificate ♯2 was duly issued to William A. Wilson, DXer of Te Kuiti, New Zealand. (WAC/YL ♯1 was awarded to W2-QHH in 1948.)

The **WORKED ALL CONTINENTS-YL** award is offered by the Young Ladies' Radio League to any amateur providing proof of two-way communication with a YL operator on each of the six continents. Formal rules for this award are being drawn up. In the meantime, essentially the rules for WAS/YL apply (see "YL's Frequency," *CQ*, June, '55). WAC/YL custodian is Opal Jones, W6PCA. Applications and QSLs should be sent to her at Route 1, Box 180, Esparto, Calif. Be sure to include sufficient postage, or IRC's, to finance first-class mail return of confirmations.

Now to have a look at some of the more active DX YLs—ones you might be apt to run across in trying for WAC/YL.

EA2CQ, Paula Mendia

VK3YL, Austine Henry

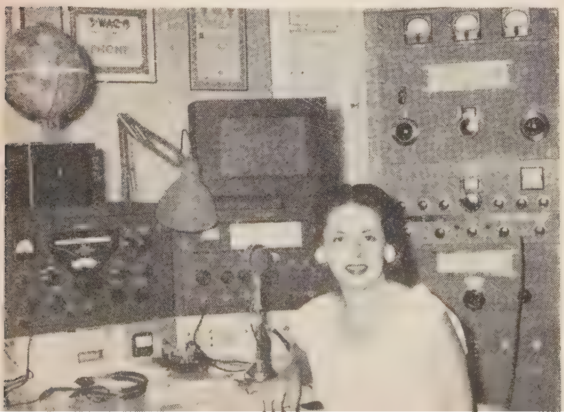
CR7LU,
Lucia Tome

EUROPEAN YLs

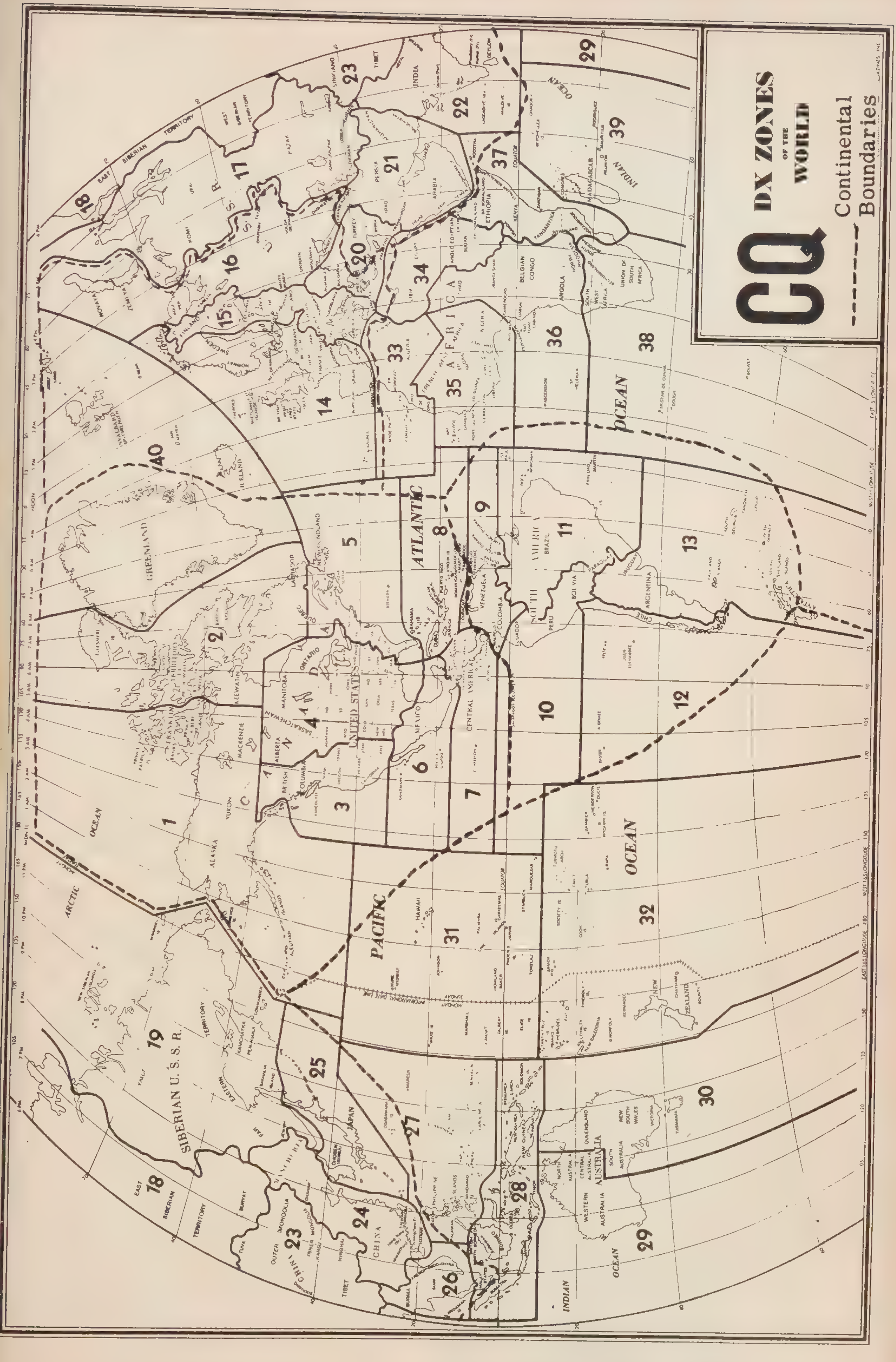
Among the *European* YLs undoubtedly the most active is **EA2CQ,** Paula Mendia of San Sebastian, Spain. As of June, EA2CQ had 200 countries confirmed, all on phone, for DXCC, and had worked well over that figure. Paula's OM, EA2CA, also is a DXer and his score is close behind hers. Paula comments,
"I guess there are few married couples—
maybe no others at all in the world—whe
man and wife are both at the head of t
world's DX on *phone*." From Costa Ric
EA2CA is the Costa Rican consul at S
Sebastian. Paula, who has a 12-yr. old daught
and a boy of 10, has been active on the a
since Aug. '50. She is at her rig daily fro
0700 to 1000 and 1490 to 1800 GCT. The
set-up is 500 watts to an 813 modulated
811A's; receivers being at 75A3, HRO-50T a
a Super-Pro. They use a 3-element rotary bea
for 20 and 10 meters.

Also active from Spain on the DX bands
EA7EV, Maria, who has well over 1
countries on phone.

Other YLs of the European continent a
pearing on the DXCC lists with 100 countri
are **G3ACC,** Meg Mills, and *OE5YL,* In
Wieder. Meg made DXCC in 1949 and al
has WAS. She works 80, 40, 20 and 10, mos
CW. G3ACC was featured in this column
CQ for July '50.



CO2BK, Maria Garcia; OM's rig
at right.

CQ
DX ZONES OF THE WORLD
Continental Boundaries
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ATLANTIC OCEAN
INDIAN OCEAN
GREENLAND
CANADA
UNITED STATES
ALASKA
MEXICO
CENTRAL AMERICA
SOUTH AMERICA
BRAZIL
PERU
BOLIVIA
ARGENTINA
CHILE
VENEZUELA
COLOMBIA
AFRICA
BELGIAN CONGO
ANGOLA
UNION OF SOUTH AFRICA
MADAGASCAR
ETHIOPIA
SUDAN
ARABIA
PERSIA
INDIA
TIBET
CHINA
OUTER MONGOLIA
JAPAN
PHILIPPINE ISLANDS
NEW GUINEA
AUSTRALIA
NEW ZEALAND
HAWAII
SIBERIAN U.S.S.R.
EAST SIBERIAN TERRITORY
ICELAND
INTERNATIONAL DATE LINE

Tino and Anita Arias, HK3FV, with HK1HQ

October *CQ* carried an FB photo of **DJ2YL,** Susi Liebig, who is active on all bands running 100 to 200 watts from Braunschweig, Germany.

CT1YA, Maria Monteiro, of Oporto, Portugal, is one of the better known YL operators in that part of Europe. As with so many YLs, her start in Ham radio came via her OM and Maria first went on the air as second op to CT1JM in 1950. With her own rig completed she used CT1A. The rig runs 45 watts, VFO; SX28 receiver and a 2-element rotary beam. Maria started out on 10 meters and especially enjoyed working maritime mobiles. Now she can be found on 20 meters—when home duties and three jr. ops allow. CT1YA writes for the Portuguese amateur magazine and has also written for *The Radio Amateur,* published in England. She comments that the number of YLs in Portugal does not reach a dozen and most of them are second ops.

I1BL, Lolly Balboani, is active on the air from Vicenza, Italy, operating on 10, 20, 40 and VHF, both phone and CW. Lolly was initiated into Ham radio by helping her brother with his soldering jobs and putting the together, and finally getting into QSOs. H own ticket came along in 1936. During t Po Valley floods she assisted in helping people evacuated. I1BL is the YL editor *Radiorivista.* (Our thanks to W3CDQ for tra lating Lolly's letters.)

YLs of Africa

Taking top place among the YLs of *Afr* who work DX is **ZS6WJ,** Ella Dunkerley, Vereeniging, Transvaal, Union of Sou Africa. The latest issue of *YL Beam,* pu lished by the S.A. Women's Radio Club, ports that Ella has received the All Afri Award from SAWRC, the first ZS YL to so, and which they feel is even more covet than DXCC. ZS6WJ's DX score stands 120 countries confirmed, and she is said have a lovely fist on CW.

Close behind Ella comes ZS6KK, Ma Cormack, of Johannesburg, with a score 140 countries worked, 109 confirmed. Prior her taking out her ticket some years ba Marie was employed by the GPO as a te graphist-teleprinter operator. ZS6KK was fi heard on the air in 1947 and in 1950 she tained DXCC. Marie also holds WAC, WBC A1 Op (USA), First Class Op (Great Britai RCC, and has won many trophies in SARL contests. Marie was on the organiz council of SAWRC in'52 and held the offi of joint secretary and was joint editress *YL Beam.* In '53 she became president a editress of SAWRC. ZS6KK runs 100 wa to an 814, using both phone and CW, thou she prefers CW. Receivers are an HQ12 and an AR88.

Another active DXer from the continent Africa is **CR7LU,** Lucia da Silva Santos Tor at Beira, Mozambique. Her score is countries worked, with 102 confirmed, she has over 40 States confirmed toward WA Lucia first went on the air in '52 and si then has logged over 2,000 QSOs. Some the W YLs to have worked her are W1F 2JDR, 3JSH, 3WUH, 5UCQ. She holds do a full time job as a radio operator in a gove ment department of radio aids to aircraft. T requires a knowledge of radio engineering Lucia felt the best way to learn was by bui ing her own rig, which she did with the h of her OM, also a radio officer. They hav jr. op, aged 8, and Lucia says he is mu interested in radio. Formerly running 50 wa at the time of writing she was building a with output of 150 watts. Receiver is an SX Despite 6 hours a day at the office on C CR7LU still prefers to work CW while Ha ming and, incidentally, she is a "south pa op. Look for Lucia on 7 and 14 Mc. especially in the DX contests. CR7LU is only YL in Mozambique with a call of own.

XE2MA,
Diana Mendiola.

Asian YLs

YLs on the continent of Asia seem to be few and far between. Apparently very active from Colombo, Ceylon, is 4S7YL, Soma Wickramasinghe. It was a QSL from 4S7YL that completed ZL1BY's cards for WAC/YL, and a number of YLs have been reported working Soma. 4S7YL is on 14 Mc. with 50 watts to a long wire antenna and using an AR88 receiver.

For other Asian YLs, W1QON reported these girls to be active in Japan: **JA1FM,** Shizuyo Tomihira of Tokyo, who is on 40 phone running 80 watts; and **JA1AEQ,** Fumi Abe of Musashine City, the XYL of JA1PK, who operates on 3.5 and 7 (and VHF) daily, the low-frequency rig running 60 watts.

YLs of Oceania

With a good number of active KH6 YLs this should make it easier to work hard-to-get (YL wise) *Oceania*. Two of the most active DXers among the Hawaiian girls are **KH6AFN,** Jeanette De Long, and **KH6AUJ,** Dottie James, both of Honolulu. KH6AFN is most active on 20 meters and puts out a good signal running 600 watts to a V-antenna (500 ft. each leg), and a 5-element Telrex beam is in the process of going up. Jeanette says she works mostly DX since that is all there is at the hours she operates—6 p.m. to midnight and on weekends later. Her daytimes are spent working in a photographic store. Jeanette plans to check into the 20-meter YL net this winter, and she also works 10 and 75. She holds WAC, has only R.I. and Delaware to go for WAS on 75, and needs only a European YL contact to complete WAC/YL. KH6AFN has been on the air since 1950; her OM is KH6ABQ.

KH6AUJ can be found on 40 CW almost every night. Dottie, who has been on the air since 1952, made WAS with only 65 watts, but now runs a 250-watt rig. The XYL of KH6OB, they have three jr. ops.

Hawaii may be easier to work for Oceania, but the best known YL in the "land down under" is **VK3YL,** Austine Henry. Last May Austine celebrated her 25th year of being a Ham—the third YL in Australia to receive a license and the first to hold a YL call. Austine has DXCC, WAC, WBE and BERTA certificates. Prewar VK3YL was active on 80, 40 and 20-meter CW and 56-Mc. phone, but postwar she has been active only on 14 Mc. Her QTH at Murrumbeena, 10 miles from Melbourne, she says seems to be a fairly good location for DX work, but she adds that conditions have been discouraging recently. However, she still loves DXing and postwar has worked 160 countries. Austine tells us that her husband heard of her interest in Ham radio prior to her sitting for the Ham ticket and came along to help her learn the code and theory—and has been helping her ever since—though he, himself is not a Ham. Prewar II she was a member of the Royal Australian Air Force Wireless Reserve and during the war years helped to instruct in the Morse code classes at the Wireless Institute of Australia while her OM was on active service. Their son, Austin, now 20, has no interest in Ham radio. VK3YL runs 30 watts, VFO, uses a 9-tube superhet receiver and a half-wave single wire antenna. Austine QSLs all contacts

CT1YA, Maria Monteiro

I1BL, Lolly Balboani, with I1FO at Milan

and would welcome calls from American stations hearing her signals. She is mostly active from 0700 until 1300 GMT.

Other Australian YLs active on the air are **VK3KS,** Thelma Stafford; **VK3US,** Gwen Churchward; and **VK2AJM,** Miss J. L. Jira. VK3KS has held her ticket for 15 years and has worked 100 countries as well as 42 States toward WAS. She operates 80, 40 and 20, both CW and phone, running 100 watts, VFO. Three harmonics, ages 9, 3 and 1, keep her occupied, but she hopes to have more time for Hamming.

VK3US, though not especially inclined toward working DX, does enjoy talking to the YLs in the U.S.A. She runs 5 watts on 80 and 40, and 100 watts on the other bands.

VK2AMJ has held her ticket for four years and operates on 14 and 144 Mc, both phone and CW. On 14 Mc she runs 50 watts, using a 16-tube homemade receiver and a 3-element rotary beam. VK2AMJ has worked over 120 countries and with QSLs close to the hundred mark she hopes soon for DXCC.

In New Zealand **ZL4GR,** Myrtle Earland, at Dunedin, is again on the air and reports getting out very well. She says she is just waiting to hear the YLs of America on and to chat to them. Myrtle, the **XYL** of ZL4AM, has held her ticket for 25 years. She operates both CW and phone on 80, 40, 20 and 10, running 40 watts into a half-wave antenna.

According to an article in *YL Beam* the most active of the New Zealand "Hamesses" is **ZL2ABJ,** Peta Gilchrist, of Napier. She has been on the air for 8 years but says in all this time she has never had a QSO on the air with another YL—either at home or overseas! ZL2ABJ operates on 10, 20, 40 and 80, mostly CW. With 75 watts she has worked over 60 countries.

South American YLs

A well known *South American* call is **HK3FV,** operated jointly by Constantino (Tino) and Anita Arias. Anita says her radio life began in Quito, Ecuador, where she and her OM operated HC1RK. After returning to Colombia they lived at Medellin where in 8 months operating HK4FV they worked over 100 countries. Now at Bogota, Anita reports conditions are rather poor and in 6 months worked 70 countries. Anita finds occasional DX on 15 but usually operates on 20 meters around 14,180, between 7:30 and 9 a.m. EST. She adds that she receives U.S. stations very well. HK3FV runs 200 watts and they use 3-element rotary beams. Awards include DXCC, WAC, WBE, and many others. Fond of the DX contests, Anita has won high score for Colombia for three years in CQ's World-Wide DX contest. Anita and Tino have seven jr. ops, the oldest 18, the youngest 8.

KH6AFN, Jeanette De Long

Another DX call in South America is that of **LU4DMG,** operated by Maria M. de Dantiacq, of Buenos Aires, Argentina. Her standing in the DXCC list is 150 countries on phone.

North American YL DXers

Many are the DX hunters among the YLs of *North America.* One is **CO2BK,** Maria Gomez Garcia, of Havana, Cuba. After sharing her OM's mike (CO2BL) for some time, Maria decided to get a call of her own and in 1952 became CO2BK. In two months she worked 97 countries. Then after spending 8 months in Europe she returned to her DXing and her 100th country, she says, was Ifni, being one of the lucky ones to have this confirmed. Her station consists of a 32V2, 75A3 and 3-element rotary, though she likes to use her OM's 500-watt rig when she's after a rare one. Her favorite band is 20 with 15 next and she gets on 40 occasionally. Several months ago her score stood at 163 countries worked with 149 confirmed. Maria also holds WAC, WBE, WAA and AAA, and is vice president of international relations for RCC.

A well known call in Mexico is **XE2MA,** Diana Santos Mendiola, the only YL in Monterrey, who has held her license for 14 years. Diana speaks little English other than radio procedures, but she has many friends in the U.S. and all over the world from her DX contacts. Incidentally, she has kept wire recordings of all of her QSOs since 1946! XE2MA runs 350 watts, using mostly U.S. Army surplus gear.

A write-up about the DX YLs would hardly be complete without a word about our W YL DX seekers. The DXCC lists include, on phone only, W1MCW, Lou (222); W2PBI, Jerry; W8BFQ, Margaret; W2FZO, Ginger. On phone and CW: W6UHA, Maxine (223); W4ITR, Ida; W1FTJ, Dot; W6YZU, Naomi; W5UCQ, Marion; W2NFR, Helen; W1RYJ, Esther.

YLs to have made WAZ include W6UHA and W6YZU, and W1MCW has 36 Zones.

Our thanks to YLRL for use of the design in our heading cut. This gal atop the world was created by W2JZX, Vi, for the cover of *YL Harmonics.*

33, and good luck in working WAC/YL!
—*W5RZJ*

A Heterodyne Crystal Calibrator

and code practice oscillator

Herbert Greenberg, W2EEJ
821 Rutgers Road
Franklin Square, N. Y.

A frequency standard is a very important piece of equipment, but one conspicuously lacking in many ham shacks. Why? The lower-priced 100-kc units are not prohibitively expensive, but it's pretty hard to pry loose any of that old moolah from the average ham unless the equipment in question either soups up his receiver or improves his signal reports. A frequency standard will not do this.

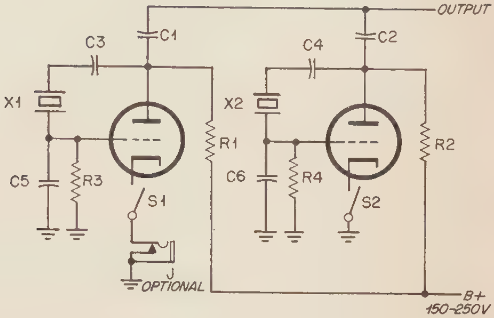
The FS will, however, provide these advantages: Full use of the bands, right down to the last kc, *with* peace of mind; sub-band as well as band-edge markers for all amateur frequencies, such as the high end of 15 meters, novice band edges, etc., if the unit is versatile enough; an instant source of marker signals for calibration of new equipment or re-calibration of old; and, in the case of the simple unit to be described, an RF *or audio* sum or difference signal providing added usefulness of the unit as in i.f., supersonic or audio generator.

Originally this unit was built to provide complete band-edge markings which were not provided by the standard 100-kc oscillator. The extreme versatility of the unit was not realized 'til afterwards.

On hand were a number of war surplus crystals of the type with channel numbers and with frequencies 25 kc apart. A back issue of *CQ* (April, '49) showed a circuit using a dual oscillator to provide an audio heterodyne beat. This circuit was modified, with non-resonant Pierce-type oscillators eliminating the need for tuned circuits as in the original. Separate switches were also provided for each triode, to permit independent operation of the oscillators.

The output of either oscillator can be used on its fundamental or its harmonics. The heterodynes are also available for fundamental or harmonic frequencies. Marker signals will be found for a considerable distance from the original or harmonic frequencies, weakening progressively with distance from the fundamental signals.

Marker signals will be spaced the difference of the crystal frequencies. 25, 50, or 100 kc are the common frequencies by which the above-mentioned surplus crystals differ, providing very useful markers.



C1, C2, C3, C4—.005 μfd mica or ceramic, 500 volt or better.
C5, C6—30 μμfd mica or ceramic.
R1, R2—15K, 2 watt.
R3, R4—68K, ½ watt.
S1, S2—SPST toggle switches.
X—crystals (see text)
V1, V2—6SN7 or equivalent (or separate triodes; see text)
J—optional key jack.

Operation

In use, one of the crystal oscillators is switched on and the receiver bandspread dial is set to the desired fundamental or harmonic frequency. The main dial is then tuned for maximum indication on the S-meter or for zero beat with the receiver BFO turned on. Then by switching on the other crystal oscillator, not only will another check point be obtained, but markers of the difference frequency will also appear for a considerable distance to either side as the bandspread dial is tuned.

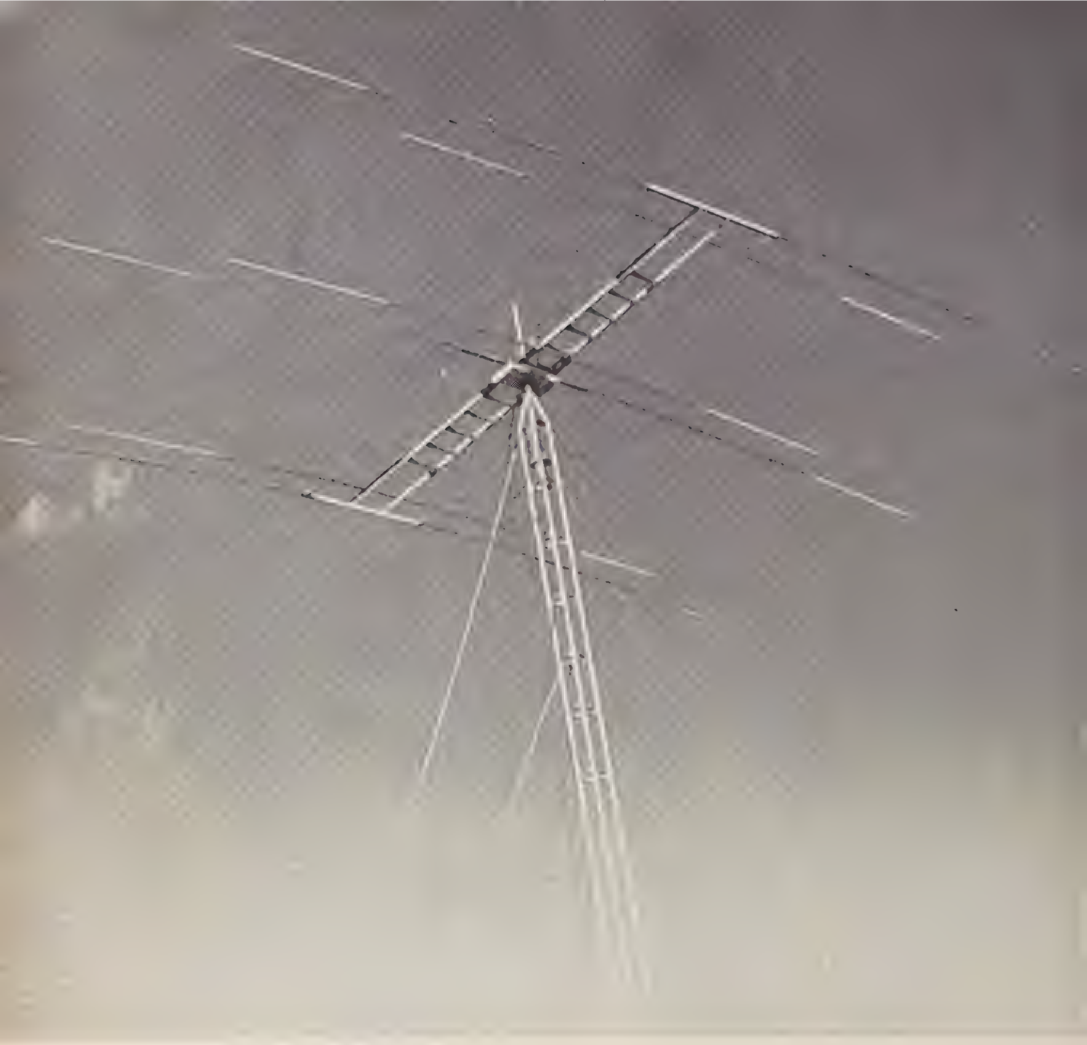
The accuracy of the markers will depend on the crystals used, and the random capacities of the circuits. It is advisable to first check them against another trustworthy source, preferably one which agrees with WWV's check points.

War surplus channel-numbered crystals in FT-243 holders were found to be satisfactory. A check against a 100 kc standard beat with WWV resulted in a low audio beat note. This is satisfactory for avoiding band edge trespassing with a VFO.

If a closed-circuit jack is wired between one of the cathode switches and ground, the output can be keyed and used for code practice. If two crystals differing by an audio frequency are available, no receiver is necessary and the output can be fed directly into a pair of earphones or into an amplifier.

Ordinarily no direct connection to the receiver will be needed, but if reception of high

[*Continued on page 50*]



20 and 15, Rotary

Maj. R. H. Mitchell, W5DWT
7303 Hirsch Dr., S.W.
Albuquerque, N.M.

Whenever hams get together, the conversation inevitably turns to antennas. For several years—ever since I left my antenna farm at KH6DD—mine has been turning to rotary beams for the DX bands. Last year, my wife finally had a surfeit of this and offered to let me spend a maximum of $200.00 for one as a Fathers' Day present. After the initial shock wore off, I started figuring my requirements, necessarily limited by the funds authorized.

Because I am in the Marine Corps, and am subject to frequent moves, the beam and its support had to be designed so they could be dismantled and moved easily. To get a lo
angle of radiation for DX work, and to get t
beam clear of decibel-absorbing power lin
the support should be about fifty feet high.
funds would permit only one structure a
rotator, it was hoped that the beam could
built to cover the ham bands from 14 throu
28 mc. Three elements were decided upon f
each band. Admittedly, a two-element bea
will give almost as much gain as a close-spac
three-element beam at any one spot frequen
but I believe that, over an entire ham ba
both the gain and front-to-back ratio of a thr

element beam will be much better. Too, the tower, rotator, and feed line cost no more for three elements.

A "TV" Tower

Five ten-foot sections of triangular steel "TV tower" were purchased for the mast. The sections used were made of one inch steel tubing, with a twelve inch cross section. A friend who is a mechanical engineer calculated that it would hold 50,000 pounds in compression, and that it would be self supporting with any beam I could erect if it were set three feet into two cubic yards of concrete. I decided to guy the tower, though, and dug a hole one foot deep and eighteen inches square beside the house. The tower was assembled to its full length and laid out with the base at the edge of the hole. A *CDR TR-4* TV rotor was installed in the top of the tower. Guys were tied to the tower at the thirty, forty one, and forty nine foot levels. (Evenly spaced levels were avoided to prevent tower resonance at guy points.) The top guys were nine-gauge solid steel, and the two lower sets were twelve-gauge stranded steel.

It took a crew of eight of us about five minutes to raise the tower, using a sixteen foot ladder to lift it as high as possible, and a half-inch line to pull it the rest of the way. One man held each of the top side guys, while the tower was being raised, to prevent sidesway. The base of the tower was set in the hole, and the guys were fastened to their supports about twenty five feet from the tower. Two legs of the tower were secured to the house at the ten foot level. Reinforcing rods were placed in the hole, and five sacks of "Ready-Mix" concrete were mixed and poured into it. When this set, the tower was rock-solid. (For the benefit of anyone wondering how I plan to move the tower, I will saw it off at the ground level, then lower and disassemble it. If I move every two years, it will still be forty feet high in twenty years.)

Magnesium Ladder for Boom

The first beam tried was built on a wooden boom and covered the 14, 21, 27, and 28 mc. bands. It was sound electrically, but failed mechanically. The beam weighed over 150 pounds and cracked the pipe flange used as a support. This beam came down, and I decided to settle for an interlaced 14/21 mc. beam using all-metal construction.

I had a twelve foot magnesium ladder (Montgomery-Ward, $24.95) which weighed only about thirteen pounds, and we decided to sacrifice it as a boom. It was too short for an interlaced beam, so the ladder was lengthened by bolting four-foot, 2"x2"x3/16" 61ST aluminum angles as extensions on each leg of the ladder on both ends. These were overlapped one foot, giving a boom length of eighteen feet. Five-foot lengths of similar material were bolted across the ends and center of the boom for cross-arms for the 14 Mc. elements. The 21 Mc. elements were bolted directly to the boom. The boom was guyed with wires running from the top of a three-foot aluminum angle, mounted vertically at the center of the boom, to the ends of the outer cross-arms. The boom was bolted to a tilting mount made of 2"x12"x16" lumber and 2"x2"x3/16" aluminum angle. The mount was connected to the rotator by a pipe flange through a length of one-inch inside diameter pipe.

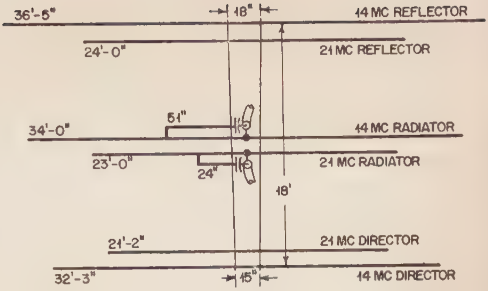


Fig. 1. Element Dimensions of 20 & 15 Rotary.

Tuning Up on 20

Tuning of the beam was done with it mounted about six feet above a ten-foot high flat roof. The field strength meter, manned by W4SRC/5, was set atop a similar roof about 150 feet away. Initially, elements on both the 14 and 21 Mc. elements were set by the formulas: Reflector 495/F; Radiator 468/F; Director 444/F. These formulas work out well with close-spaced beams using "plumber's-delight" construction, and also with insulated beams. Some hams had indicated that the non-insulated, metal ladder construction made no difference in element lengths, but this didn't appear logical, so we wanted to make sure with this beam.

To eliminate interaction, first tuning was done with just the 14 Mc. elements in place. Tuning was done at 14.15 Mc. The reflector had to be lengthened eighteen inches, and the radiator and director fourteen inches from formula lengths for maximum field strength. The boom was eighteen inches wide at the reflector end, and fifteen inches wide at the director end, so the elements had been lengthened by about the width of the boom. Then the elements were insulated from the boom temporarily, and upon retuning, were found to be back at about formula length for maximum field strength. (This same situation has been found to be true with two- and four-element beams built since then. At KA2EC, field strength with a four-element, metal-ladder boom beam increased 20 d.b. when the elements were increased by the boom width, as compared with the correct length of a similar beam's elements using a single pipe boom. This was checked in on-the-air tests with KA2NA.)

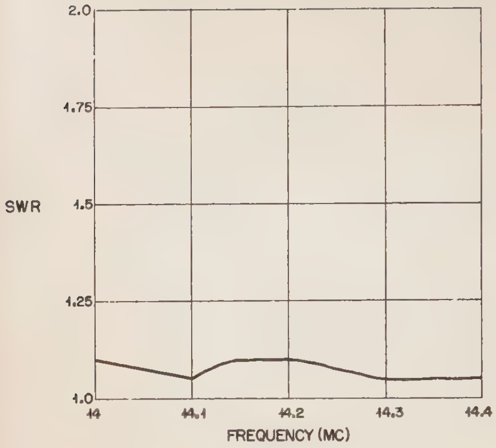


Fig. 2. 14 Mc. S.W.R. at 16 feet.

The 14 Mc. elements were bolted to the beam again, and the 21 Mc. elements were set in position. As had been expected, considerable interaction was encountered. However, the 21 Mc. elements had little effect on their 14 Mc. counterparts, so the 14 Mc. elements were retuned for maximum signal. The director had to be shortened three inches, the radiator one inch, and no change was required in the reflector because of the addition of the 21 Mc. elements.

Tuning Up on 15

Next the transmitter was set to 21.2 Mc., and coupled to the 21 Mc. beam. A good set of tuning conditions could not be found. Front-to-back ratio was virtually non-existent and there was no power gain over a dipole. Then, during rotation, it was found that the beam showed a good gain at forty-five degrees off the left of the beam heading. The trouble was traced to the gamma match. Until the gamma was adjusted for minimum s.w.r., the beam peaked well off the heading. When it was adjusted for minimum s.w.r., the beam peaked about ten degrees to the left of centerline. The beam showed good gain over a dipole, and had a good front-to-back ratio. The 21 Mc. elements were affected by the boom, which had a shortening effect, and by the 14 Mc. elements, which had a lengthening effect. This last was much greater on the director and radiator than on the reflector.

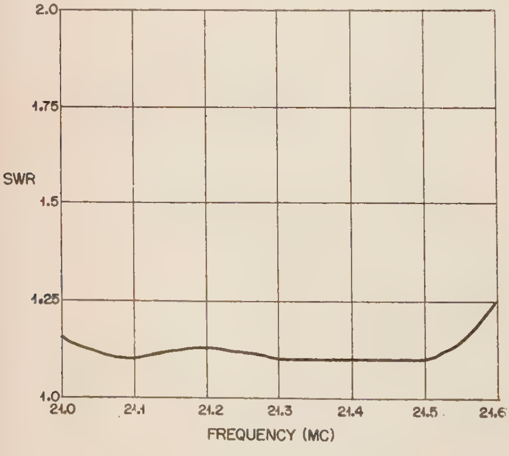


Fig. 3. 21 Mc. S.W.R. at 16 feet.

Tuning the Gamma

The two gamma matches were tackled next. The gamma match is a nice system, but I found, as others have, that it requires a series condenser for optimum performance.[1] [2] (Reading of these articles is recommended for detailed information on adjustment of the gamma match.) Without the series condensers, and with equal element lengths in each half of the radiators, lowest s.w.r. was about 2.5 to 1. By changing lengths of one half of each radiator, the s.w.r. could be brought down to about 1.8 to 1, but this went up rapidly with frequency variations, and made the beam pattern lopsided. The series condensers and proper gamma lengths brought the s.w.r.'s down to those shown in Fig. 2 and Fig. 3. Heavy wire was used in the first gammas. However, the s.w.r. changed with every movement of the elements or gamma wires, so the wire was replaced with quarter-inch aluminum tubing. These were spaced four and six inches from the 21 and 14 Mc. elements, respectively, with aluminum straps at the outer ends, and lucite strips at the inner ends. 2500 volt mica condensers were used for the series condensers. Values were determined by substitution, while readjusting the lengths of the gammas for minimum s.w.r.'s. Values of 50 uuf for 14 Mc., and 60 uuf for 21 Mc. were found to be optimum. Of course the metal boom affected the gamma lengths, but we didn't stop to find out just how much difference the boom made.

Raising the Beam

Raising the beam into position was relatively easy. A rope was looped around one of the cross members of the tower, and the boom was pulled up by two men on the ground. One man kept the beam from swinging, and kept it away from the tower and guys with two light ropes on the lower end of the boom. Two of us went up the tower, bolted the boom to the tilting mount, tied on the coaxial feed lines, aligned the rotor. and the beam was on the air. (Incidentally, the guys were removed completely from one side for a few minutes while we were on top of the tower. Our combined weights ran over 450 pounds, and this, along with 54 pounds of beam, resulted in less than an inch of top sway, so the tower is rugged enough for anything a ham might erect on it.)

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[1] Davis, W. H.: "Practical Adjustment of the Gamma Match", QST, February, 1953.

[2] Orr, W. I.: "The Terrible T and Gamma, too!," *CQ* October, 1953.

The s.w.r. of the beam on the tower was checked next, and the results are shown in Fig. 4 and Fig. 5. Our findings agreed with Orr's.[2] The s.w.r. had increased somewhat, and the resonant frequency of both beams had shifted upward. The next beam built will be tuned lower in the band. However, the s.w.r.'s were still quite acceptable. As a matter of fact, these beams have the greatest s.w.r. bandwidths of any parasitic arrays I've used. I don't know whether the interlacing or the wide metal boom could be responsible, or if we were just lucky, but it was a situation we accepted happily.

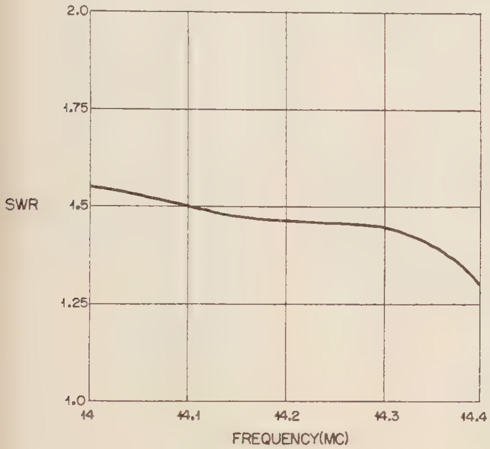

Fig. 4. 14 Mc. S.W.R. at 50 feet.

Front-to-Back Ratio

Tests on discrimination showed the 14 Mc. beam to have at least 20 db. front-to-back ratio over the entire band. Some checks ran as high as 45 db., but the average was observed to be about 25 db. Front-to-side ratio was as much as 70 db. Signals which were S-9 plus 20 db. on my *75A* could be dropped into the noise level at the 85 to 95 degree positions on each side. These ratios held good up to 15 Mc. where they are checked against WWV regularly. The 21 Mc. beam appeared to have a 15 to 20 db. front-to-back ratio across the band, and has about the same front-to-side ratio as the 14 Mc. beam. The asymmetry originally noted in the 21 Mc. beam pattern seemed to be corrected with the beam on the tower.

A ground-plane vertical, 16 feet high had been used on 14 Mc. Comparisons showed that the 14 Mc. beam was never less than 15 to 20 db. better than the ground-plane, and gains as high as 40 db. were observed at times. Signals that were inaudible on the ground plane have been well over S-9 on the beam, and I'd been working quite a bit of DX with the ground-plane. No decent comparison antenna was available for the 21 Mc. antenna.

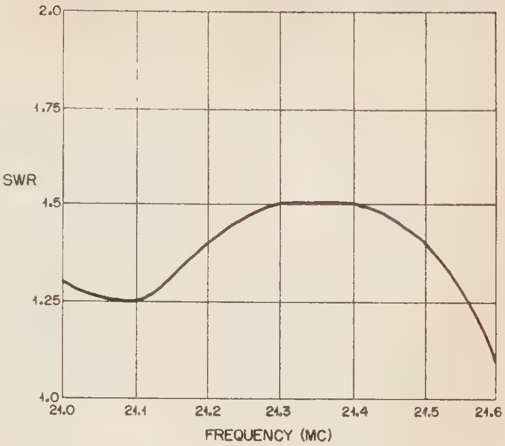

Fig. 5. 21 Mc. S.W.R. at 50 feet.

On-the-Air Tests

No antenna story is complete without a little boast as to how it performs on the air. This one has worked all continents but Europe with 100 watts on 21 Mc. phone. All continents have been worked on 14 Mc. c.w. with similar power. With a kilowatt, I have received S-9 reports from all continents on 14 Mc, and frequently am reported as the only western U.S. station being heard in Europe. In the last DX contest, 20 Europeans were worked in two hours on 14 Mc. (I miss quite a few, too, however.) The beam also works on U.S. contacts. In the last C.D. party, 31 stations were worked in 30 minutes on 14 Mc.

The beam has been up for about a year and has handled light icing and strong winds nicely. The first week the beam was up, it took gusts up to 70 m.p.h., and has been taking winds almost as strong since.

Fixing Rotator Drift

One difficulty was encountered. Our *TR-4* doesn't have a magnetic brake, and the beam drifted with winds over about 10 m.p.h. A letter was written to the Radiart Corporation asking what could be done about this, as stations I desired to work couldn't always be found into the wind. They replied that the newer *TR-4's* have a magnetic brake, and that drift in the older models—one of which I had received, somehow—could be stopped by putting six volts d.c. across the motor windings while the beam isn't being turned. About 800 ma. at six volts was supplied to the motor from a transformer/selenium-rectifier power supply and the trouble was cured. Switching from "rotate" to "hold" voltages is accomplished with a d.p.d.t. switch.

My total investment in the beam wound up at about $220.00, but, as is obvious, I consider it money well spent.

Enjoying ~~WORKING~~ DX

Roth Jones, VK3BG

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DX, like most other branches of amateur radio is what you make it. To many of us it is a high pressure, highly competitive business of exchanging reports, collecting QSLs and cursing those who do not reciprocate with a card to confirm "our enjoyable contact."

But to others, who like to add some enjoyment to their long distance communication activities, it is little more than an exchange of remarks on weather, equipment and hopes for better conditions.

Distant lands have always interested me, probably because many of my DX friends live in them, and because I have travelled widely myself in the last 20 years. The more I read about and studied these countries, the more interested I became in them, especially in their people and how they live. To me it became an absorbing, fascinating study.

In the post-war decade when DX has been almost my sole radio interest, I began to take an even deeper interest in "the other side." From it all I have gained a knowledge which would have taken years to build up without my DX contacts.

But first what is Geography? and what is DX? Let's turn to *Webster's New Collegiate Dictionary* (with apologies to my many friends in England with their equally fine *Oxford* dictionary!) Webster defines geography briefly: "The science of the earth and its life, especially the description of land, sea and air and the description of plant and animal life including man and his industries."

Note that this definition goes far beyond our schoolday version when the subject, to us anyway, went little beyond maps, topography and occasionally primary industries. The definition of Webster is so broad it incorporates almost every facet of a country's activity.

Now, another brief look at Webster's, to read its version of DX: "Distant; distance;—used to designate long distance radio transmission."

Although basically the two definitions are perhaps far removed, they can be easily related if we use DX as a means of studying geography through an exchange of information, verbal and written. But more of that later.

In the late 1940's when I and many others were chasing countries DX soon became a monotonous bore. I would stay up for hours waiting for some rare DX contact to sign and join in the scramble hoping that I could make the contact and increase my DX tally. And if I did, the contact rarely lasted more than a few minutes. The DX vultures, never too far away, were always urging me to finish and "give them a go." One summer morning around 3 a.m. one rang me on the land line with the blunt: "Hurry up and let me have a crack at that rare one you're on to."

After months of burning the midnight oil I started to take stocks. I wondered whether it was worth it. Where was it getting me? I asked myself. All I was getting out of this hobby, one of the greatest in the world today, was much lost sleep, the ill effects of too many cups of black coffee, an abundance of rare radio cards but no *knowledge* (and my golf handicap was steadily rising each time I found time to play 18 holes on a Saturday afternoon!)

So, prompted by my good friend Lord Rennell of Rodd, former president of the Royal Geographical Society in London, visiting here on business, I began to make an elementary study of geography. Most of my DX work was now confined to 'phone contacts. And oddly enough I found there were many others like myself sick of chasing the "rare ones," who were content to talk about their countries and everything in them . . . from the people and their industries to the early days of colonization.

And what more pleasant way is there of spending an evening, especially if there are guests, than to chat away on the various aspects of one another's countries? As I have told many of my American friends time and time again: "I love Australia. It is a great country." But they too are proud people and love their country as dearly. So much so that they want to tell me more about it. No one ever "wins" these verbal exchanges; no one ever wants to. But we all have something to gain, something for which Man has a unique faculty—Knowledge.

You may ask how this basic geographic knowledge can be gained quickly and easily without browsing through a heap of text books absorbing material which is hard to understand and not relaxing.

First there are some 'musts': in expensive books of record which should be in every home, especially if there are school children around.

The first is a good modern *atlas*, with a full gazeteer. Many of us in Australia and Britain use *The Oxford Atlas* published by the Oxford University Press. It is full, complete and very accurate. However, W7FA tells me the *New Hammond Atlas* published in New York recently is a first class work and ideal for the geographic minded DX man.

This is kept near at hand, and any town mentioned is quickly turned up, generally in a matter of seconds. Then if my DX contact does not want to exchange reports and work more DX, I turn up the town in Webster's Geographical Dictionary, a book worthy of its place in any amateur radio library.

Now it is just plain sailing. If we are lucky enough for the town, city or district to gain a mention in Webster's Geographical Dictionary (which has information on about 40,000 of the world's cities crammed into its 1352 pages), there's a topic of conversation right away.

If, as often is the case, it does not get a mention here I ask *why?* Often it's a small town of the back blocks yet to me just as interesting as a big city.

And so the search for geographical knowledge through amateur radio goes on.

For years I have subscribed to *The National Geographic Magazine* which, in the narrative style it fosters and presents to its two million odd readers so well, tells some vivid tales of out of the way places, many where amateur radio is often the only regular contact with the outside world.

In Australia this magazine costs £3/0/7 per year and is well worth it for the wealth of information it contains.

The National Geographic Magazine is a book of reference and, if bound each year, the index (always with the December issue) can be turned up quickly. I recall many an enjoyable night chatting with DX men in countries on the antipodes to Australia with brilliant *National Geographic* colored photographs of their cities and peoples in front of me.

Few magazines anywhere in the world present as full an account of places as this magazine in its presentation of humanized geography. The pictures are as varied as the articles and places presented—physical features of localities including aerial views, people at work—and their amusements, their typical dress, festivals, customs and way of life, industries, art and architecture which often is of most unusual design, important public institutions and public works, scenes of historical significance, natural history—animals, birds, plants, insects and fish. Always to the front is the "strange and curious."

For the DX man here is a magazine almost as personal as his own DX contacts, for through its picture series *The National Geographic* tries to make the reader feel he is visiting and seeing the highlights of an interesting place.

When I became interested in geography I found myself an unofficial radio P.R. (public relations) officer for my country. The more I talked about Australia, the more my friends, particularly those in Europe and America, wanted to read about it. One from Prague in Czechoslovakia has since migrated to Australia following his initial introduction to this country via Amateur Radio.

At first I sent them newspaper cuttings of articles on the Australian scene. Back came the eager requests over the air for anything more I could get for them. "It is so interesting and our children love reading about your country." Since then I have always had an abundance tourist information on Australia availab which I gladly exchange for similar booklets other countries.

Like Australia, most countries today are kee to "sell" themselves. It is part of the wor pattern for good will and a subtle plug for th tourist trade. In Australia we have our sta tourist bureaux, the *Australian National Trav Association* (which once printed thousan upon thousands of QSLs for us with an Au tralian theme on them) and the Australia *News and Information Bureaux,* a Governme body with representation in the world's leadi cities. My approaches to these organizatio have never failed. Indeed they have been successful that a request on behalf of a D friend often results in a package of informati booklets and information on Australia bei sent within hours of a DX QSO.

Only recently Sister Emiliana W1HUH, t first Nun to take out an amateur radio call the world, asked me for some information Australia to assist the boys in her class wi their project work. I do not know what t Sister has received but I'll guarantee these bo will be busy on their Australian geograph project for many months.

The information on other parts of the wor which has come to me from my DX friends exchange for this Australian geographical liter ture has been a treat to receive, read, file aw and turn up again in leisure moments when t bands are dead.

Apparently the ready cooperation which in Australia get from our tourist and inform tion bureaux is not confined to this countr Even from far-away St. Helena I recently ceived some pamphlets which made fascinati reading. Although Napoleon has eviden passed into history and does not even get mention, the literature told how many Eu pean and American businessmen are retiri to the historic South Atlantic isle.

So next time you exchange reports with blunt QRU, think twice. It isn't getting y very far. Try studying a bit about your o country and tell the story to others far afie They'll appreciate it and if they have any r interest in their own country they'll have j as good a story to tell you.

Perhaps you won't fill your log book quickly, and your intake of QSL's might dr off, but you'll build a valuable knowledge modern geography, a knowledge which f people are able to gain so easily.

And what better way is there of fosteri good will than the exchange of knowled Scientists have done it for centuries. We in small way can do the same.

So it's about QRU here now. Just recei a bundle of pamphlets from a crayfisherm on Tristan da Cunha I worked last year I'm quite anxious to look at them.

New conversion data on a widely-popular non-surplus item

Converting the XYL

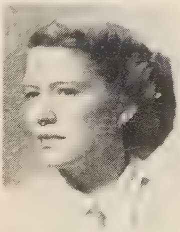
Florence V. Collins, W3DBN
Box 16, Landenburg, Pa.

Here it is, OM! The schematic for a slick conversion job. When you finish, you have an XYL ham operator to share your enthusiasm for this fascinating hobby. No more spats about spending $9.98 for a special condenser when she needed that money for a new blouse or grass seed or the grocery bill; no more accusations like "You think more of those stupid old knobs and dials than you do of your own family"; no more dirty looks when you present her with a nice low pass filter for her birthday.

"Sure," you say, "That's a real good idea, but—. I've tried a lot of times to get her interested but it just doesn't work. She doesn't like messing around with the rig; she can't get the theory; she thinks the code is silly. Anyway she says she doesn't have time. I guess radio is like throwing a ball. Most women just can't do it."

However, as a very new Novice XYL (who is working hard on her General) I am here to tell you "it ain't necessarily so." The trouble is that you OMs start off on the wrong tack. Let's face it—most gals aren't interested in the tubes, condensers, coils and other little gadgets that you men find so intriguing. This theory, this other language of watts, ohms, impedance and frequencies that you speak so glibly sounds like so much mumbo-jumbo to us. The feminine sex in general just is not born with that knowledge of physics, electricity, and all things mechanical that most men possess innately. But there is one thing common to all women—they love to talk. If anyone should doubt that, let him walk into a supermarket, a beauty shop, or any other place where women come together. Staying home all day alone, or with no company over five years of age can get pretty dull, so when we get out we like to talk to people, other adults who have the same interests and problems that we do.

Now, this is where ham radio comes in. Most any XYL would get excited about being able to talk to other girls all over the country any time she wanted to. Just like having unlimited telephone service. So, tune in one of the YL nets or a couple of YLs just rag chewing, and turn up the audio. Let your XYL listen for awhile. She'll discover that licensed hams, feminine gender, are just that—feminine. They talk about the same things her coffee club talks about—their kids, the price of steak, their



The author passes along the following specs on the pilot model for the conversion job described in this article: "Name: Florence V. Collins. Call: W3DBN. QTH: Landenburg, Pa. Occupation: 1. Housewife, and 2. Medical technician, currently working part time in two doctors' offices to pay for a Viking I and an NC125. *Other* Hobbies: Cooking, photography, a Siamese cat and five alley cats. Family: No jr. ops as yet; OM is Jim, W3DBL, a chemist with Du Pont Co . . . and his other interests are: Building furniture and our house, which we partly built ourselves."

sewing and other hobbies, even their OMs. Or, if that doesn't interest her, she'll find other YLs or even OMs who are glad to pass the time of day on most any subject. And they are all very friendly and anxious to make new contacts. Pretty soon, she will be panting to join in.

Of course, there is that little matter of a license. But the hardest job, arousing some interest and proving that ham radio is not strictly a male hobby, is done. After all, she has heard all these other girls on the air who have passed their exams. She's just as smart as they are. She can do it too. And if her resolution begins to falter, give her a big pat on the back. Anyone that can do a good job as cook, housekeeper, baby tender, chauffeur, nurse, laundress, general handyman, and mistress of the exchequer, certainly shouldn't be stopped by the FCC exams.

From my own personal experience, I think it is easiest to aim first for a Novice ticket. It is comparatively simple for anyone to pass that exam with a minimum of study. And it can be taken right at home where one is less apt to get rattled. Once you pass it and get a license and your own call, isn't that the best incentive to really get down to work with the Handbook for that General?

The best place to start is by teaching the XYL the code. And you will probably be surprised by how fast she picks that up. Most women have much less trouble mastering the code than men do. Send slowly to her, make sure she knows all the letters thoroughly, have an infinite amount of patience (a primary requisite for teaching your XYL anything) and soon she will be copying five words a minute easily.

Then it is time to start on the theory. And that is where the difficulty begins. Some day I am going to write a book on "Ham Radio for the XYL." Most books I have studied fall into one of two categories. They are either so simple that anyone who has been exposed even briefly to high school physics can go through them at one sitting; or they are so technical that one needs a PhD to get beyond the introduction. The best thing seems to be for you OMs to develop your own study course, using the Handbook as an outline and reference book. Above all, keep it simple. If formulas scare your XYL, skip them. Get a couple of resistors out of your junk box, hook them up to a low power d-c supply and let her measure the voltage drop across them. Then the formulas will explain themselves. Don't hesitate to point out examples of the things you are studying in the rig. But don't get so wrapped up in your subject that you drag the poor girl in way over her head. If she begins to say "yes, dear" every two minutes and stares at the mess of wire and gadgets with a glassy-eyed expression, you haven't hypnotized her with your oratory. She is lost and just plain bored. So slow down, back up and get back to the fundamentals.

A good place to start in explaining circuits is with a schematic for a power supply. When you think that you have explained this very clearly—after all this is so easy, anyone could get it—stop and go over it again and make sure she really understands. Does she have the flow-of-electrons theory straight and the difference between AC and DC in the circuit clearly in mind? Can she follow through the diagram from the source of AC to the output of DC? If not, start again.

Another important thing to remember is to stop while you're ahead. So you could talk about radio all day long and far into the night. To someone who is just learning, it isn't quite so fascinating. . Make your lectures brief and to the point. Then save some for the next day. Discuss something else at mealtimes. With a little encouragement the XYL will soon be digging in for herself when she has a spare minute during the day. She will probably get more out of things she is able to study in the morning when she is fresh than in the evening after a hectic day with the kids, no matter how good a teacher you are.

If by this time the XYL has obtained her Novice ticket, you won't have to do much about getting her code speed up to 13 wpm. Then, being able to operate the transmitter, she will find "how it works" much more interesting. Learning what makes it run, she will learn, is a necessity. Suppose something should go wrong while you are at work. If she can't determine what has happened, her only alternative is to stay off the air for the rest of the day, miss her scheduled QSOs and maybe even be reduced to watching TV.

One word of caution. Remember that the XYL's chief interest may be in talking to people. If you are the type who likes to build and experiment as an end in itself rather than merely as a means of getting on the air, don't be distressed if the XYL doesn't share your enthusiasm for a soldering iron and a roll of wire. One of the reasons for the large following ham radio has is the wide diversity of interests it serves so well.

Six months later, here we are with your converted XYL all ready to take her General. It wasn't such a difficult task, was it? The main necessities are patience, encouragement, and a real desire to do things together. As an old do-it-yourselves-together family who have gone from building our own furniture through several other hobbies to ham radio, we can testify that it makes things a lot more fun and life runs a lot more smoothly.

Uh . . . there is just one more thing I should mention in all fairness to the OMs. Having a converted XYL doesn't end all your problems. In fact, it may create some new ones. So, when you eat Spam and beans the third night in a row because the XYL is saving out of the house money for a twenty meter beam; and when you can't operate in the evening because she was too busy to get on during the day and just has to tell XYZ how the dress turned out—don't say *I* didn't warn you.

The conflicting selectivity requirements for the various types of emission permitted Radio Amateurs and for the differing degrees of band congestion have increased the need for improved adjustable bandpass filters. W4RDM's approach, and one solution of the problem, is the use of two fixed-width filters coupled by a heterodyning stage.

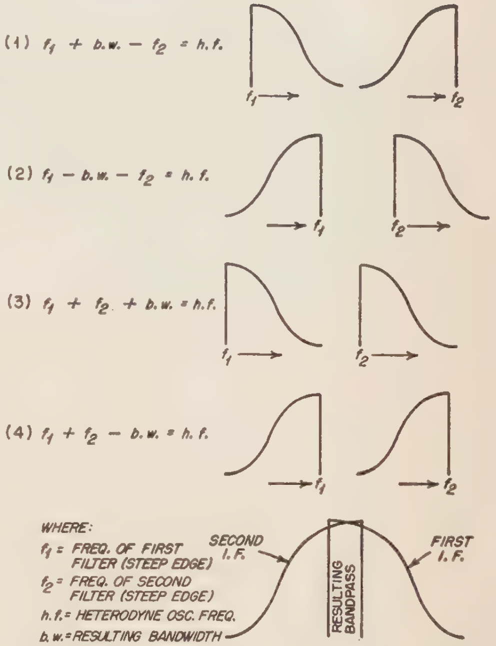
a Variable Band-Width Filter

Leo F. Gorzkowski, W4RDM
1216 N. Rolfe St., Arlington 9, Va.

CW, Radioteletype, Single Sideband and AM Phone call for different degrees of selectivity. Quartz crystal, mechanical, and LC filters can be designed with excellent characteristics, insofar as high out-of-band rejection, steep "skirts," freedom from "ringing" and uniformity of response within the acceptance band are concerned, but all are equally inflexible when we attempt to make them adjustable in band width. The method successfully employed by the writer requires two filters but will yield *any* desired amount of selectivity less than the filter band width.

Dual Filter System

This method uses two band pass filters, each having the maximum or greater than maximum desired bandpass. Maximum obtainable selectivity or bandpass is dependent upon the steepness of the slope of *one* edge of each of the filter pass bands. The resultant curve has a flat top and steep sides which approach the characteristics of the ideal response curve. The advantage over crystal lattice type filters may readily be seen: ease of adjustment and much lower insertion loss. Improvement over mechanical filters is seen to be that any desired bandwidth *less* than the pass band of the individual filters is obtainable. The principle can be applied in the construction of single side band and radioteletype filters, requiring fewer parts as well as simpler adjustment than conventional fixed-bandwidth filters. The single frequency converter stage needed in this system will also yield some additional i-f amplification in the receiver.


(1) $f_1 + b.w. - f_2 = h.f.$
f_1
f_2
(2) $f_1 - b.w. - f_2 = h.f.$
f_1
f_2
(3) $f_1 + f_2 + b.w. = h.f.$
f_1
f_2
(4) $f_1 + f_2 - b.w. = h.f.$
f_1
f_2
WHERE:
f_1 = FREQ. OF FIRST FILTER (STEEP EDGE)
f_2 = FREQ. OF SECOND FILTER (STEEP EDGE)
h.f. = HETERODYNE OSC. FREQ.
b.w. = RESULTING BANDWIDTH
SECOND I.F.
RESULTING BANDPASS
FIRST I.F.

EXAMPLE:
FIRST FILTER (500-506 KC) HAS STEEP SLOPE AT 500 KC. (f_1 = 500 KC)
SECOND ONE (100-106 KC) HAS STEEP SLOPE AT 100 KC. (f_2 = 100 KC)
THEN FORMULA (3) APPLIES:

(3) $f_1 + f_2 + b.w. = h.f.$

SO FOR A DESIRED BANDWIDTH OF 2 KC:

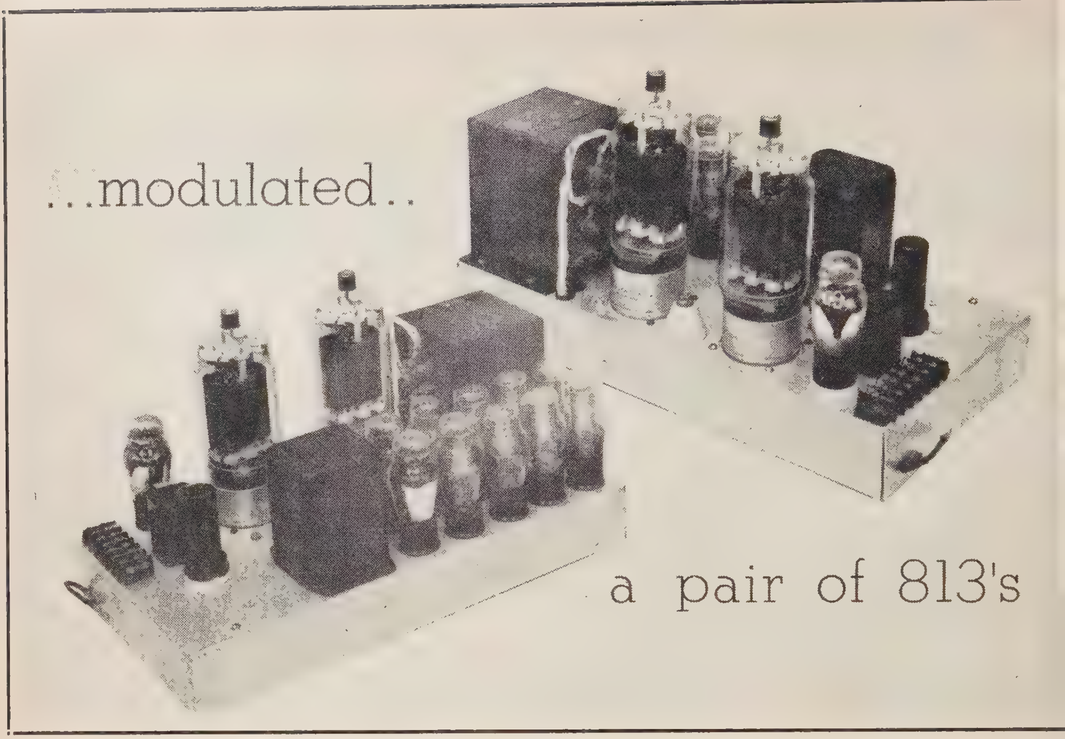
(500) + (100) + 2 = 602

WITH THE h.f. SET AT 602 KC A FLAT TOPPED, STEEP SIDED 2 KC I.F. CHARACTERISTIC IS OBTAINED.

The frequency range accepted by the first filter is converted, or heterodyned, by means of a standard mixer or converter, to a new range falling within the pass band of the second filter. The overall response of the cascaded filters is dependent upon the conversion oscillator frequency. This heterodyne frequency will determine what portion of the spectrum passed by the first selective network will fall within the acceptance range of the second filter. Note particularly that only *one* edge of each of the filters needs to have a steep slope. The opposite edge can have a gradual cutoff, in fact, if it were not for certain practical considerations, a combination of lowpass or highpass sections might be used instead of band filters. Thus merely twisting the knob on the conversion oscillator will widen the "slot" through which the signals pour or narrow it to razor-thin dimensions. The cascaded filters may be composed of LC, Quartz, or Magnetostriction types. Any filters having satis-

[*Continued on page 42*]

...modulated.. a pair of 813's



Paul H. Lee, W2EWP/YV
Asst. Ch. Engr., Intelec S. A.
Caracas, Venezuela

This unit was built to fit an available space in the cabinet rack which houses our 800-watt transmitter. The modulation transformer is a surplus *RCA Type 900777,* from a 500-watt (output) broadcast transmitter. It is designed for a 15,000-ohm plate-to-plate modulator tube impedance, and a 5000-ohm power amplifier load.* Because of its size and weight, it is not mounted on the modulator chassis, but rests on the bottom of our cabinet rack and this modulator unit fits in the space beside it.

The unit is built on a sheet aluminum chassis, 8″ x 15″ x 2″ in size. Inspection of the photographs will show the physical arrangement of parts. The layout is neat, and leads are kept as short as possible. Grounds are short and direct to the chassis. The unit contains a minimum of parts, and can easily be assembled and wired in one evening.

The individual cathode current meters are mounted on the front panel of the transmitter, at eye-level height, and are not shown in the photographs.

Design

813's were the logical choice for modulator tubes, because of their high power output, extremely low driving power, and low cost. Their one disadvantage, to us at least, was the requirement for a well-regulated 750-volt screen supply. In our existing transmitter, the exciter stages were powered by a 400-volt supply. We finally solved the screen voltage problem by use of a dropping resistor of the same size as i usually employed when 813's are used in an r- power amplifier, together with a bank of voltage regulator tubes. The screen current of a pair o 813's operated under class AB2 condition varies from about 5 to 60 ma., with applicatio of audio grid voltage. Therefore it was neces sary to use ten VR-150's in a series-paralle arrangement, inasmuch as a single string o them in series would handle only about 35 ma current variation.

The use of the ten VR-150's results in a ver stable screen voltage and is much cheaper tha a separate 750-volt supply. Even if you buil this unit and have a 750-volt supply available we recommend that said supply have goo regulation, so that you can realize the full un distorted power output of the 813's. This ap plies not only to 813's but also to any othe beam pentodes used in audio work.

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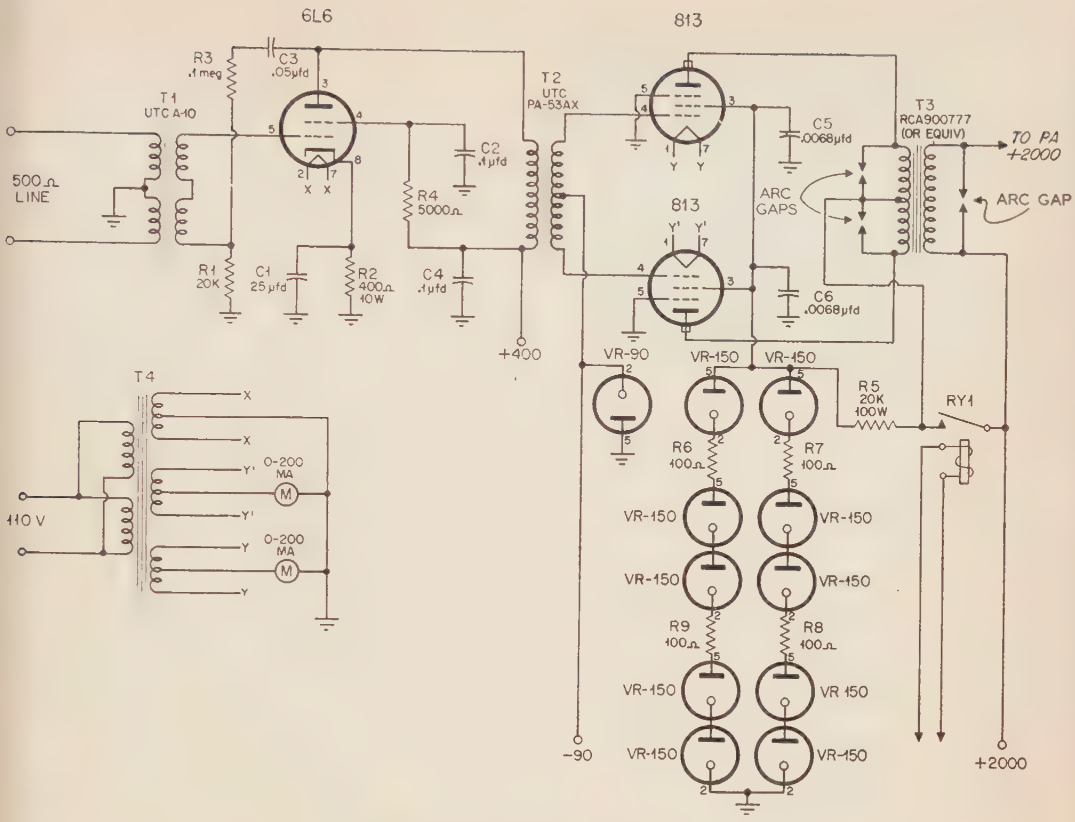
* The following transformers are available and may substituted:
  - Chicago Transformer #CMS-3
  - Thordarson #T21M65
  - U.T.C. #CVM-5
  - S.N.C. #5P363 or 5P364
  - Kenyon #T-442



Schematic of 500 Watt Modulator.

We also recommend the use of the VR-90 to hold the bias voltage at 90 volts. Even though the driving power required by the 813's is very low, *some* power is required when operating under class AB2 conditions, and this results in a slight grid current flow on peaks. Grid current flow invariably results in a change in bias voltage, unless the bias supply is regulated. A change in bias voltage means that you will have some peak distortion. A VR-90 costs very little, and it requires no filament power, so let's not "cut corners" by saying that we don't need it because it's only voice operation—let's put it in and make the unit a *good* one.

6L6 Stage

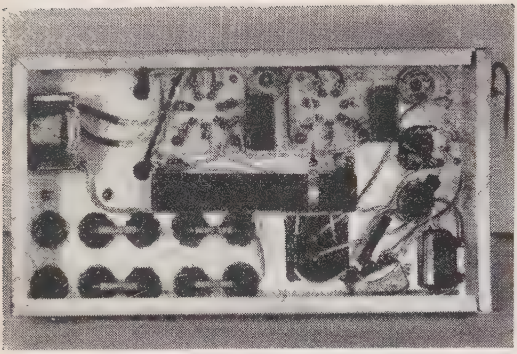
The use of a 6L6 in the input stage may be questioned. Let us state here, for the record, that a 6F6 or 6V6, with lower plate voltage, will provide ample drive for the 813's. We happened to have plenty of 6L6's on hand, so we used one. It does *not* overdrive the 813's; first, because we have included a large amount of negative feedback to reduce distortion, improve frequency response, and to hold the load impedance of the 6L6 fairly constant with changes in load due to grid current peaks in the driven stage, and second, because we use a limiter or compressor amplifier ahead of this unit, to prevent over-driving. The interstage transformer should be one with a low resistance secondary winding.

Control Relays

Relay *Ry1* is a *Leach Type 1601-MX* high voltage relay, with a 115-volt coil connected in series with the contacts of an underload relay in the cathode return of the class C stage. This system protects the modulation transformer and tubes from damage by removing modulator plate and screen voltage whenever the power amplifier cathode current falls below 300 ma. The relay is actually mounted on the modulation transformer itself, at the primary centertap. It could be mounted on this chassis, however, next to the 6L6, using properly insulated mountings. The modulation transformer also has arcing gaps installed across both primary and secondary windings for overload protection.

Construction

The dual-winding, 10-volt filament transformer is mounted at one corner of the chassis, with the 6.3-volt transformer mounted below it on the underside of the chassis. The voltage regulator tubes are mounted as close together as possible, in a group, on the same end of the chassis. The 813 sockets are mounted flush,


Bottom View of Modulator.

under the chassis, with the positive 2000-volt terminal insulator between them. The 100-watt screen dropping resistor is mounted securely on small ceramic pillar insulators, so as to clear both the chassis *and* the bottom of the cabinet rack on which the chassis rests. The input transformer, *T1*, is located close to the 6L6 tube, and as far away as possible from the filament transformer(s) and wiring. The wire shown in the photographs, which is fastened to the outside of the chassis near the terminal strip, is a direct ground from chassis to cabinet rack. The 813 plate terminals connect to the modulation transformer with short flexible leads.

Operation

There are no tricks in this circuit. It is very straightforward, and easy to build and operate. Any good modulation transformer capable of handling 500 watts of audio power can be used. You may drive it with almost any speech amplifier which will provide a level of 0 DBM across a 500-ohm output. Or, if you like, use a single button carbon microphone and incorporate a gain control in the input circuit. This unit, with a plate voltage of 2000, will deliver 450 watts of audio power to the modulation transformer, with measured peak distortion in the order of 6%, and allowing for losses in the transformer, will fully modulate 800 watts input to a class C r.f. stage. Individual cathode currents average about 130 ma. per tube for voice operation, and rise to 190 ma. per tube upon application of audio tone for 100% modulation. Remember that these meters read the sum of plate, screen, and grid currents. They are in the cathode leads to reduce HV hazards.

In closing, we believe that this unit is well worth building if you are interested in high-power operation. However, remember that it *is* "high-power," and it should not be operated in the open, without shielding and interlock protection. *SAFETY* first!

Variable Bandwidth Filter

[*from page 39*]

factory performance as fixed-width selectivity devices will give equally satisfactory results in the variable-selectivity assembly.

Example

Let's have an example showing how we could employ this principle to our advantage in a receiver. Suppose we have two mechanical filters, both having 6 kc band width but each having a different mid-frequency. The full 6 kc band width can be realized by adjusting the heterodyning frequency so that a signal passing through at the mid-frequency of the first filter will enter the second filter at its mid-frequency. Varying the oscillator plus or minus 2 kc will result in a 4 kc band width since portions of the spectrum passed by one filter will not be accepted by the other. Tuning the oscillator 5 kc from the full-width position will allow only a 1 kc "slice" of spectrum to be passed. Continuing with this example, let us assume that the first selective network passes a range from 500 to 506 kc and that the second passes all frequencies from 100 to 106 kc. Thus the mid-frequency of the first is 503 kc and that of the second is 103 kc. The converting frequency to secure the full 6 kc bandpass will be 503−103 or 400 kc. The oscillator could also be tuned to 503+103 or 606 kc with the same results (this, of course, assumes a symmetrical pass band with similar slopes on upper and lower edges). If, now, the oscillator is set to 602 kc it will convert anything coming out of the first filter to a new range of 96 to 102 kc. As we have previously assumed that the second filter accepts signals only in the range of 100 to 106 kc it is obvious that the only frequencies reaching the output will be those in the range 100 to 102 kc. Sideband inversion may be obtained by changing the conversion oscillator to the other of the two frequencies (400 and 606 kc in the above example).

Filter Requirements

As previously mentioned, we are not restricted to mechanical filters. The same benefits may be obtained by using crystals to chop one side of the response curve of the conventional transformer coupling used in i-f amplifiers with the addition of absorption wave traps to reduce the response of frequencies farther removed if required. The slope of the critical edge of the passband should be made as steep as possible. Several crystals may be used in the familiar shunt arrangement in order to secure a sufficiently rapid cutoff.

Naturally the formulas to use will be dependent upon the crystals available as well as which edge we select to be the steep-slope edge. The four formulas given here take care of all possible cases of two filter combinations with the steep slope at the upper or lower frequency limits of the pass bands.

Notes on Narrow Shift

Boyd "BeeP" Phelps, W9BP, W0BP
4232 Scott Terrace, Minneapolis 16, Minn.

The original thought proposed at the N.Y. RTTY gathering in March was for a handful of amateurs to seek special temporary authority to experiment with 170 cycle shift. The idea has been made more flexible to include any shift under 900 cycles and broadened to include any experimenters who may come and go without paper work, so narrow shift is of keen general interest.

At this writing, the change in amateur regulations is pending before the FCC, but no serious hurdles are anticipated. The advantages of narrow shift benefiit both the RTTY and CW factions as far as interference is concerned, and the improvement in selective fading holds considerable promise of improved results. (See CQ, Aug. 1955, p. 30-31)

Time and use will determine the best equipment to use, but some notes, suggestions and report on preliminary tests may be in order. It is a certainty that stability in transmitters and receivers is very important. For example, if we have been using "mark" and "space" filters 200 to 300 cycles wide for present 850 cycle shift, it is to be noted that 170 cycle shift is just 1/5 as much, and comparable band pass filters would be only plus and minus 20 to 30 cycles wide, which gives some insight into transmitter and receiver stability needed. A number of VFO's heard on the air need rebuilding anyway as the radio art progresses, and the half bushel of crystals that wouldn't shift 850 cycles would now mostly be usable. Imitation of VHF crystal controlled converters (without frequency multipliers) seems very applicable to narrow shift reception, and long warm-up time of all components in the shack that have any influence on frequency drift is desirable.

There are several systems of terminal units that can be made to work between the receiver and the printer. The venerable W2BFD stagger tuned audio system can be used by straddling the cross-over frequency between the "mark" and "space" frequencies. This is illustrated in Fig. 1 in which the differential diode current is plotted against frequency. Actually alone each amplifier has response into the region of the other amplifier, but where the response is equal the diode currents offset each other. The curve shown is not ideal but illustrates the point that by receiver tuning for 170 cycle shift with beat notes of 2380 and 2550 the 2465 cross-over frequency will be straddled and the resultant currents not far from maximum.

In practice, not only are these filters too broad for 80-40-20 meter operation where interference may be three layers deep in many heterodyne tones, but the straddle act is like balancing a pyramid or cone on its point: theoretically possible but somehow it always seems to go one way or the other on trial. The filters made by Bill Gates of KHJ for a hobby are M derived band pass 200 cycles wide and with low resistance torrid coils approach such nice square block frequency response for 850 cycle shift, but the cross-over point at 2550 cycles is about 30 db down and tuning by the straddle method also critical as well as weak. Some thought has been given to switching a second "space" filter centered at 2125 plus 170 or 2295 cycles, but the "mark" filter would still be broader than desirable so a fresh start with a new pair seems preferable.

It was decided that as the shift was being divided by five, stability, band width and other characteristics having a factor of 5, that for comparison purposes it would be interesting to use audio "mark" and "space" frequencies (produced by receiver tuning) that

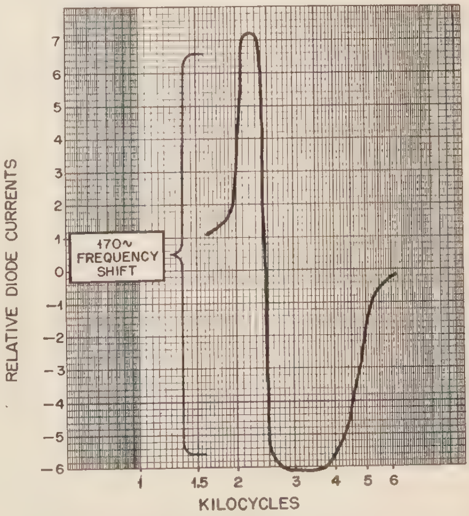


Fig. 1. Diode current vs. frequency.

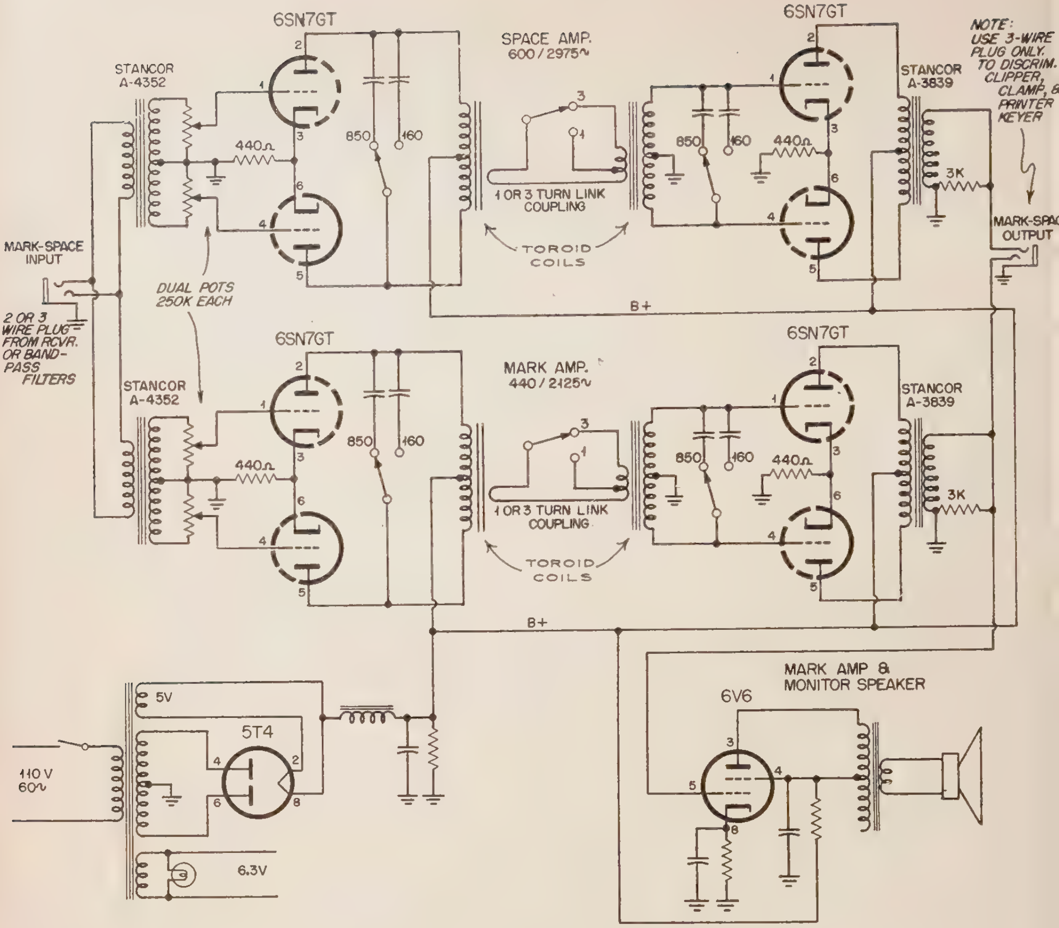


Fig. 2. First experimental model.

would be 1/5 those used at present. This calculated to be 425 and 595 cycles, but realization that amateur audio frequency standards are not especially accurate, the frequencies were raised slightly to match the tones of 440 and 600 cycles transmitted alternately by WWV of world wide range with high power on eight carrier frequencies. The 160 instead of 170 cycle shift is absorbed by receiver tuning with an error of only 5 cycles on each filter which is a fraction of the band width expected. Should this become commonly used, the sub-standard shift can be 160 cycles if we get really precise. Tests can now be made at any hour of the 24 with WWV, to observe response, limiting action, drift, etc for four minutes on each tone.

As the Q or quality of a coil is its reactance divided by its resistance, reduction of coil resistance from over a hundred ohms to just a few ohms by adoption of toroids is a step in the right direction in the field of audio selectivity. A new pair of amplifier channels was hurridly made of junk parts plus some telephone type toroids obtained from W5HZF via W9TCJ. The little doughnuts are smalle than a devalued half dollar, are 88 millihenries 8 ohms d-c resistance, and no external magnetic field problems. Small capacity couplin between units was a headache because th tuned coils in the unloaded grid circuits wer always sharp while the plate circuits, bein loaded, had such a low peak that stagge tuning for square flat top response was no obtainable. A better impedance match wa obtained with link coupling by threading on turn thru the plate coils and three thru th

Table I

Data on 88 millihenry Toroid Coils

Frequency	Reactance	Calculated Capacity to Resonate
2975 cps	1630 ohms	.0329 mfds.
2125	1150	.0652
600	327	.811
440	240	1.507

Table II
Fixed Condensers Used to Stagger Tune the Audio Filters

F.S. Switch	Amp. Freq.	Input (Plate)	Output (Grid)
"850"	2975	.042 (.022 & .02) mfds	.032 (.022 & .01)
"850"	2125	.057 (.047 & .01)	.069 (.047 & .022)
"170"	600	.85 (.5, .1 & .25)	.75 (.5 & .25)
"170"	440	1.6 (1, .5 & .1)	1.35 (1, .25 & .1)

Variations of several percent are to be expected.

grid toroids. The coils actually have two identical windings which are series connected, so it was a natural to use push-pull all the way thru, eliminating d-c saturation, interstage coupling via power supplies, and the need for cathode resistor by-pass condensers.

The circuit of this first experimental model is shown in Fig. 2. Switching is provided by a four pole five position rotary switch, two positions being used to provide either 850 or 170 cycle shift by changing the values of the padding or tuning condensers across the toroids. Larger toroids would have better low frequency Q, but these were available easily, work excellently, and are commonly thrown out by telephone companies. Table I shows the calculated condenser values to resonate to frequences of interest, but as razor sharp peaks are to be avoided for easier tuning, actual values should stagger each side, somewhat as shown in Table II. The little condenser decade box CDB-3 clipped across the various coils is very handy in tuning and well worth the dozen dollars or so of its initial cost. The diagram needs little explanation to those allegedly skilled in the radio art. Input transformers are Stancor A-4352, line to push-pull grids, dual potentiometers with audio tapers were used, output transformers were Stancor A-3839 push-pull plates to magnetic speaker windings, and the 6V6 with speaker was already on the chassis so was hooked up to monitor the mark signal. A three wire output plug and jack connects to the usual RTTY discriminator, clipper, clamp and printer keyer tube circuits.

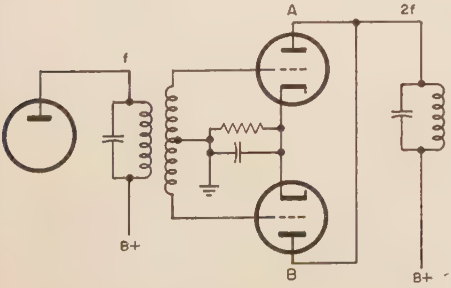


Figure 3.

Tests were run on Aug. 4, 1955 with W9TCJ, Williams Bay, Wis., some 300 miles distant, on 7140 kcs subject to usual fading. As narrow FSK was not authorized, C-W dashes were sent alternately on two frequencies separated 170 cycles and observations made on the output of this unit. The scope presentation instantly changed from horizontal to vertical line, the discriminator diode currents reversed, the printer ran wild on "space" and was quiet on "mark" frequency, and all indications were that RTTY could have been sent and received. Tuning was quite critical but not as difficult as anticipated. No band pass filter was used for 170 cycle tests but the receiver tone control was set at "bass boost" which eliminated a lot of noise.

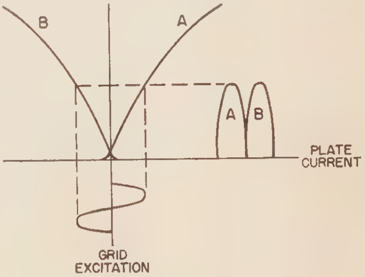


Figure 4.

A different approach to adapting present equipment to narrow shift is the harmonic multiplier. This would take a narrow shift signal after reception and convert it to 850 cycle shift where it would fit present gear. For example, with an incoming signal having 213 cycle FSK, the receiver is tuned to produce audio tones of 531 and 744 cycles. These tones drive a harmonic amplifier having cut-off biased grids in push-pull but with plates in parallel. See Fig. 3. The combined plate circuit therefore gets two identical pulses of current for each cycle of grid excitation, as shown in Fig. 4. This produces a double frequency of 1062 and 1488 cycles in one stage, and a second stage produces 2125 and 2975 cycles which matches present equipment commonly

[*Continued on page 120*]

A Complete Amateur Oscilloscope

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617—8th Avenue East,
OWEN SOUND, Ontario, Canada.

As a general rule, the oscilloscope found in an amateur station will fall into one of two classes. It is either a commercially built unit (or kit) with vertical and horizontal amplifiers and sweep oscillator; or it is simply a cathode ray tube with a high voltage supply (sometimes taken from the transmitter) with simple connections and no amplifiers.

Few amateurs use the oscilloscope to observe received signals because of the difficulty in changing the connections from the transmitter to receiver and back again. The receiver chassis usually has to be taken from the cabinet and the receiver i-f section disturbed to view received signals. As a result, both the commercial oscilloscope and the simple, basic circuit leave a lot to be desired in the way of flexibility, ease of operation, number and type of patterns available and general, all round usefulness in the station.

With the unit described here, any one of five patterns may be selected at the flick of a switch —two from the transmitter and three from the receiver. There is enough gain on a received signal to fill the 5 inch screen. Even an S-3 signal will give a useful pattern. Switching from receiver to transmitter does not affect the receiver alignment. Best of all, it need not cost a lot of money. As a matter of fact by a little judicious horse-trading and the use of salvaged parts from old receivers you too may have a cash outlay of exactly nothing. Old receivers were obtained by the simple process of going around to some of the repair shops and carting away a few relics which were scheduled for the garbage. They will provide power supplies, a number of resistors, condensers, tube sockets, controls, tie points, and you might even use one of the chassis.

The complete circuit diagram is shown in Fig. 1. It is an oscilloscope with the vertical amplifier tuned to the i.f. of the receiver and with a means of switching the deflection plates to select the desired pattern from the transmitter or receiver. A wave envelope pattern or a trapezoid can be selected from the transmitter; a wave envelope, an ellipse or a trapezoid from the receiver. It also has a built in monitor which allows the output of the modulator to be checked by ear while the modulated r-f output is viewed at the same time. In this way hum, distortion, etc., can be quickly isolated if they occur.

Power Supplies

Fig. 2 shows the high voltage negative supply for the cathode-ray tube and the low voltage positive supply for the sweep oscillator and

Complete Amateur Oscilloscope Parts List

R1—50,000 ohm pot.
R2, R12, R29—100,000 ohm, ½ w
R3, R8, R9, R27—500,000 ohm pot.
R4—250,000 ohm, ½ w
R5—50,000 ohm, ½ w
R6, R7—5 meg. ½ w
R10—2 meg. ½ w
R11—3500 ohm, ½ w
R13—5000 ohm pot.
R14—3000 ohm, 2 w
R15—50,000 ohm, 10 w
R16—20,000 ohm, 1 w
R17—2000 ohm, ½ w
R18, R24, R25—1 meg. ½ w
R19—100 ohm, ½ w
R20—10,000 ohm variable
R21—15,000 ohm, 2 w
R22—100,000 ohm pot.
R23—10,000 ohm, ½ w
R26—2 meg. pot.
R28—1000 ohm, 1 w
R30—500 ohm, ½ w

C1—1 mfd. 2000 v
C2, C3—16 mfd. 450 v
C4—8 mfd. 450 v
C5, C6—.02 200 v
C7—.005 mica
C8—.1 mfd. (see text)
C9—.00004 mica
C10, C13—.0001 mica
C11, C12—.01 400 v
C14—.02 400 v
C15—.05 400 v
C16—.1 400 v
C17, C19, C20—.25 400 v
C18—.004 mica or paper
T1, T2—Receiving type power transformers.
T3—I.F. transformer (see text)
S1—3 bank rotary switch
S2—2 bank rotary switch
S3—Single pole, single throw switch
Ch—Small receiver choke.
J1—Open circuit jack.

amplifiers. Two small receiver type power transformers with their secondaries in series provide approximtaely 1250 volts negative in the half wave circuit. No specifications are given for these as any two transformers with the required filament windings will serve and the 5BP1 will perform satisfactorily on voltages from 1000 to 1500. When making the series connection with the secondaries make sure the voltages are in phase. This may be done when the connection has been made by checking the entire secondary a-c voltage. If it is low, reverse the connections to one primary. The values of the resistors in the bleeder network will require

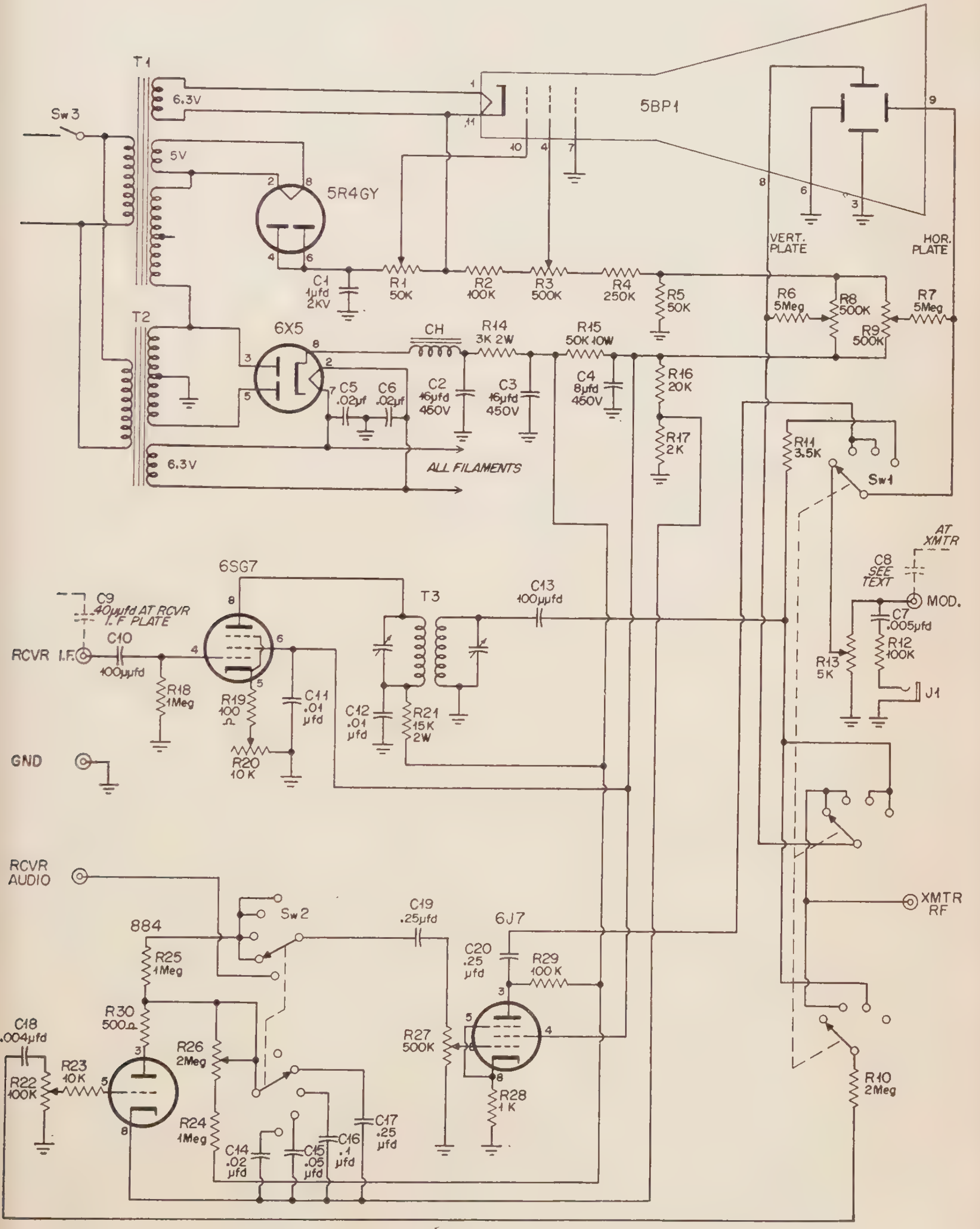


Fig. 1. Complete schematic for the amateur Oscilloscope.

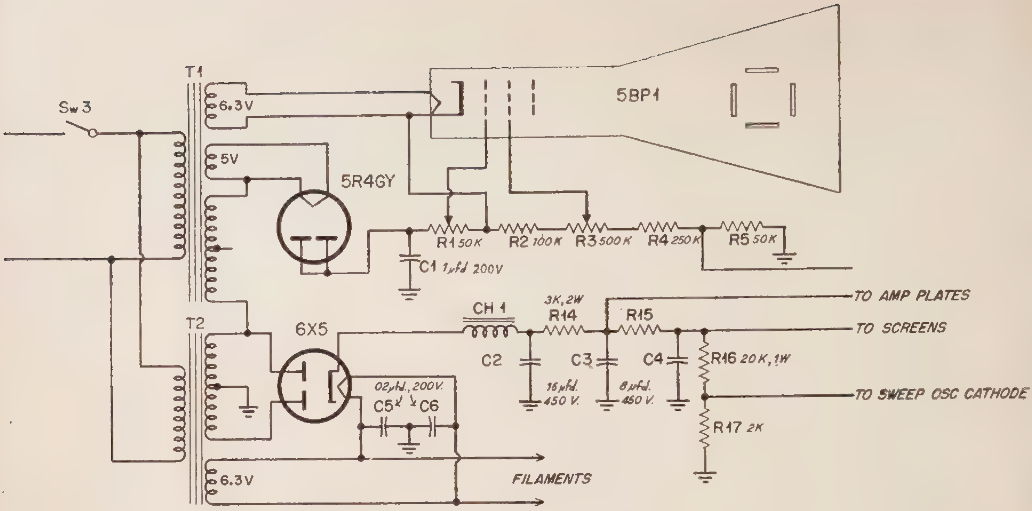


Fig. 2. High voltage negative and low voltage positive supplies.

no change except possibly R5. This may have to be changed from the value shown as will be explained with the centering controls. Since receiving-type power transformers normally do not have electrostatic shields between windings some a-c ripple can be expected on the trace. This will appear only on the wave envelope and is not objectionable for there is plenty of amplification to spread the trace across the screen and all signals can be synchronized to remain steady on the screen. The transformer winding used to supply the low voltage positive supply should be capable of approximately 350 volts output.

Amplifiers

The circuit of the i-f amplifier for the vertical deflection plate is shown in Fig. 3. The i-f transformer used is one that will resonate at the frequency of your receiver i.f. Coupling to the receiver is made through a shielded cable to a .00004 μfd. condenser mounted as close to the receiver tube socket as possible. A number of points throughout the i-f section will provide a signal but the best location is the plate of the last i-f stage. The potentiometer in the cathode of the 6SG7 acts as an amplitude control. If you use a standard setting for this control and use a transparent graph on the scope screen, accurate signal strength readings can be made. Alternatively, the control may be calibrated against a standard amplitude on the scope screen. Variation of this control has some effect on the low voltage positive supply and thus alters the sweep frequency slightly but this is not serious and can be ignored.

The 6J7 amplifier and 884 sweep oscillator are conventional oscilloscope circuits. C14, 15, 16, 17, are selected by one section of S2 to provide various sweep frequency ranges. Fine frequency control within these ranges is provided by R26. Usually, when observing the wave envelope pattern, it is best to adjust the sweep frequency so that it synchronises with the unmodulated carrier and keeps it stationary with no movement to right or left. This will make the pattern of ordinary voice frequencies much easier to observe. Sine wave patterns of any frequency within the range of the oscillator can be locked in and will remain motionless. The 6J7 amplifier is used to amplify the output of the sweep oscillator so that the trace may be spread the full width of scope screen. There is more than enough gain for this purpose. When using a trapezoid pattern from the receiver this stage is used to provide additional amplification for the audio signal from the receiver.

Although the voltage to the plates and screens of the amplifiers and sweep oscillator may vary within limits, the cathode voltage of the 884 sweep oscillator should be kept within

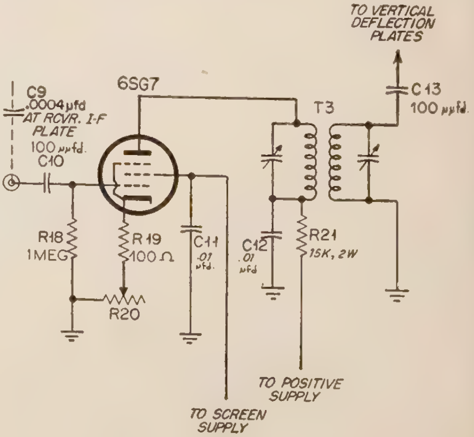


Fig. 3. I-f vertical amplifier.

a range of 5-8 volts positive with respect to ground. This voltage is taken from the positive end of R17. Variation outside these limits will affect the linearity of the sweep oscillator, distorting the audio waveforms.

Centering Controls

The centering controls are two 500,000 ohm variable controls R8, R9, connected as shown in Fig. 4. One end of the combination is approximately 100 volts positive and is tapped off the positive bleeder network. The other end is approximately 100 volts negative tapped off the high voltage negative bleeder. The actual voltage used may vary slightly from this value, but care must be taken to see that both positive and negative voltages are equal, or within a very small percentage of each other, at these two points. If they are not, the value of R5 should be changed. This will change the value of the negative voltage at the common connection of R8 and R9. R5 should be adjusted until the negative voltage equals the positive voltage at the other end of the resistor combination.

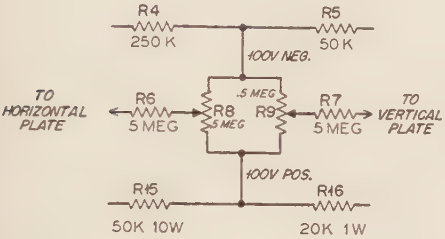


Fig. 4. Centering controls.

Monitor

The monitor consists of a 100,000 ohm resistor in series with a .25 μfd. condenser to an open circuit jack. Plugging a pair of phones into the jack completes a circuit to ground and a portion of the audio from the output of the modulator appears across them. Removal of the phones opens the circuit. The values are not critical and may be altered to provide the desired volume and quality.

Switching Circuit

A three bank rotary switch is used to switch the deflection plates of the cathode-ray tube to the various connections at the transmitter and receiver to produce the desired pattern on the screen. Switch positions are numbered 1 to 4 and patterns are produced as follows:

Position ♯1. Transmitter Trapezoid

♯1 position connects the horizontal plate to the modulator output through R13 and C8 (which is mounted in the transmitter). This condenser must have a voltage rating considerably higher than the voltage existing at the point of coupling. With plate modulated rigs this should be connected at the top or plate end of the modulation transformer secondary and should have a voltage rating at least twice the final plate voltage. With other forms of modulation the voltage rating should be in proportion to the existing voltage. In clamp tube modulated rigs C8 is connected to the screen of the final tube or to the plate of the clamp tube. The voltage rating should be twice the peak screen voltage. The vertical deflection plate is connected to a pickup loop positioned near the final tank coil. All connections to the scope terminals are permanent and are made through shielded cable. The height or amplitude of the trapezoid is controlled by the position of the loop at the tank coil. The width is controlled by R13. Any phase shift in the pattern will be apparent in the folded sides and may be corrected by changing the value of C8. Reference to a handbook should be made for interpretation of the various forms the trapezoid may take.

Position ♯2. Transmitter Wave Envelope

This position connects the horizontal deflection plate to the output of the sweep frequency amplifier and the vertical plate to the r-f pickup loop in the transmitter final. At the same time, some of the r-f signal is fed to the grid of the sweep oscillator through R10 and C18 to provide sync voltage. With no modulation the carrier appears as a solid band across the screen. Its amplitude will be the same as that of the trapezoid previously set by the pickup loop.

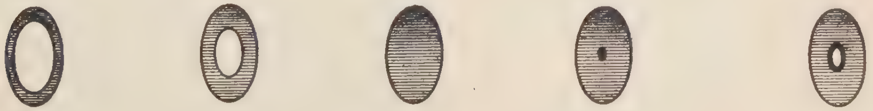

ELLIPSE SHOWING CARRIER WITH NO MODULATION.
CARRIER 50% MODULATED.
CARRIER 100% MODULATED.
GREATER THAN 100% MODULATION.
EXCESSIVE DRIVE TO MODULATORS WHICH ARE NOT CAPABLE OF 100% MODULATION.

Fig. 5. Elliptical modulation patterns.

Position ♯3. Receiver Wave Envelope

This position connects the horizontal deflection plate to the output of the sweep frequency amplifier and the vertical plate to the output of the i-f amplifier. Part of the signal from the i-f stage is fed to the sweep oscillator grid as sync voltage. In setting this position up after the connections have been made to the receiver, tune in a fairly strong broadcast station and adjust the i-f trimmers in the scope transformer for maximum signal amplitude. Make sure the control in the 6SG7 cathode is turned to maximum gain. At resonance, an S-8 signal should fill the screen. Touch up the receiver i-f section and alignment is complete. Pattern amplitude will be controlled by R20 and the setting of the receiver r-f gain control.

Position ♯3. Receiver Trapezoid

Leaving S1 in Position ♯3, a trapezoid of the received signal is obtained by turning S2 to its ♯5 position. This leaves the vertical plate connected to the i-f amplifier output and the horizontal plate to the sweep oscillator or horizontal output. The input of the horizontal amplifier now is connected to the receiver audio terminal and at the same time the sweep oscillatory circuit is opened. To secure a trapezoid showing no phase shift the connection at the receiver may require some experimentation. It should normally be found at an audio plate or grid but may also be found at the output transformer or speaker voice coil.

Position ♯4. Receiver Ellipse

In this position the vertical plate is connected to the i-f amplifier output. The horizontal deflection plate is fed part of this signa through R11. This signal will shift approximately 90 degrees in phase and an elliptica ring will appear on the screen. Under modulation this ring will appear as in Fig. 5. At 100% modulation the center area fills solidly. As th modulation level exceeds 100% a bright butto appears in the center of the figure. This patter has the ability to disclose quite simply an plainly the operating conditions of a distan transmitter wherein the modulator is overdrive in an attempt to secure more audio or modulating power. In this case the ellipse cente area fills to the maximum modulating ability o the transmitter and no more. As the modulato tubes are driven beyond their maximum a bright ring appears in the center of the figure Under these conditions splatter and distortio become distinct possibilities.

Parts layout is not critical but various positions of the power transformers should be trie to give a minimum of A.C. pickup on the trace A shield over the cathode-ray tube is recommended and shielded wire should be used t connect the deflection plates to the switch. The author was able to obtain a used oscilloscop chassis and panel and a cover was made fro light galvanized iron. However, any metal sho could make up the required chassis and pane at little cost.

HETERODYNE XTAL CALIBRATOR

[from page 29]

order harmonics is desired, insulated wires from the oscillator output and the receiver antenna terminal may be loosely coupled by twisting them together for a few turns (without stripping back the insulation to make direct electrical contact).

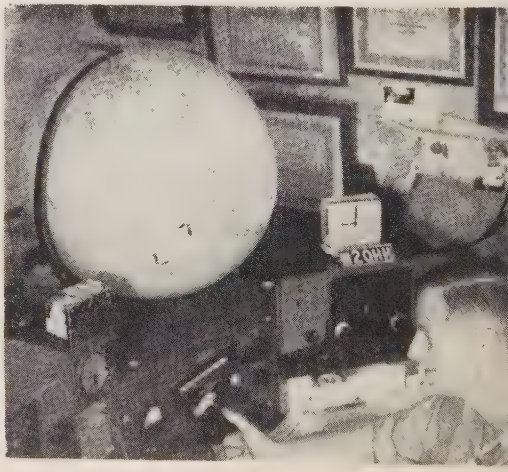
Layout, tube types and components are not critical. Separate tubes would work as well. A loktal 7N7 was used in the original unit, but a 6SN7 or 12AU7 would perform as well. A pair of 6C4, 6C5, 6J5, 76, 37, 56, or 27's could be used if desired. The common-cathode 6J6 would need relocation of the on-off switch in the B plus leads to obtain separate oscillator function.

A small chassis will suffice, or the circuit can be added in the corner of a small utility power supply, which was done here. Power could easily be supplied by the station receiver.

Other uses include calibration of VFOs and alignment of communication receivers.

Even if a 100 kc standard is available in the shack, many uses will be found for this dual oscillator unit. Since it is inexpensive and easy to build it will be well worth the small investment of time and effort.

LOOK!
The new CQ WORLD GLOBE
in the shack of DXer W2QHH



Wait 'Til Next Year!

The 1955 World Wide DX Contest

by Bill Leonard, W2SKE

W2SKE

It is something like heresy for a contest man to admit—looking back at the most recent rat-race—that 'conditions were excellent', but from where we operated, at the QTH of 'Buz' Reeves, W2HJR, there simply is no other way to describe the high frequency bands during the 1955 World Wide phone contest over the Oct. 22 weekend. For example, all continents were worked on 10, 15, 20, and 40 (shades of 1948!). Activity was high, particularly from Europe and the Middle East. You had to look hard to find a disappointing note. Lack of activity on 40 and 80 fone (to say nothing of 160) kept the lower frequency scores from approaching those of other years. But judging solely from the score at W2HJR (multioperator) you can expect some whoppers when the final tallies are in.

Last year the highest North American score was W1ATE's 176,881 and the world high CN8MM's 276,488. W2HJR's unofficial total is a trifle more than 450,000. This was accomplished by three operators, W2HJR, W2SKE and young Dave Rosen, W2GLM, operating two transmitters simultaneously for the full 48 hours (with some interesting exceptions noted below).

The paradise at W2HJR is located 20 miles north west of New York City on a 155 acre tract consisting of meadowland, forest and three lakes. In previous contests the station has been a single-operator set-up using W2SKE/2, but this time the OM, 'Buz' decided to take a fling. In the CW contest Lenny, W3GRF was at the bug.

The antennae will get by in most dreams. On one 110 foot rotating mast: 12 elements on 20, 15, and 10—6-element Telrex beams stacked one full wavelength. e.g. 36 elements on the mast.

On another tower—400 feet away—5 element yagi's for 10, 11, 15, and 20 . . . ranging in height from 100 to 118 feet.

The third tower is 120 feet high. At the top is a full size 3 element 40 (one of the first ever built, incidentally), plus stacked yagis on 6 and 2.

Low frequencies? Well, we got by on 80 and 160 with a 1226 foot V beam, an average 80 feet high, cut for the 80 meter band, and headed NE-SW. Separate tuning tanks for 40, 80, and 160 can be cut in by relay toggle switches from the operating position.

Oh, yes . . . a few miscellaneous dipoles for 40 and 80, too.

The transmitters consisted of (a) a KW-1 with somewhat souped up audio, and a Johnson kilowatt final excited by a 32-V2.

Receivers—75A-4 and 75A-3.

Interaction between the two transmitters and the various antennas was so low that it was possible to operate them simultaneously on different bands without the slightest difficulty. But within the space of an hour at about 1100 G.M.T. Saturday, modulation transformers went West in both rigs. For eight hours W2JHR was strictly single operator using the 32V2. This probably cut the final tally by 100 contacts, but, by Collins, we knocked off 41 stations in one hour with the little rig.

At W2HJR, and apparently everywhere else, 15 just about replaced 20 as the primary daylight band. In spite of the fact that 20 was open to somewhere for every one of the 48 hours, 270 stations were worked on 15 to about 220 on 20.

Fifteen finally lived up to its promise. WAC was worked in a single 15 minutes period. The band opened up on the East Coast to Europe as early as 1100 GMT and was still showing signs of life to ZL land and the South as late as 0010 GMT! Ten was another beauty, just coming into its own after the long sun-spotless hibernation. W2HJR's log shows 115 contacts with 30 countries and 15 zones . . . . . just a taste of things to come. Signal strengths, however, were about 15 db down from 15 meters.

Twenty remained the country and zone champ, however, from our QTH; 29 zones

[*Continued on page 121*]

ALL TIMES IN EST

EASTERN USA TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe	0830-1100 (2)	0700-0830 (2) 0830-1200 (4) 1200-1330 (2)	0600-1100 (3) 1100-1300 (4) 1300-1600 (2)	1500-1630 (3) 1630-2100 (4) 2100-0400 (2) 1700-0300 (3)*
Southern Europe & North Africa	0800-0930 (2) 0930-1200 (3)	0630-0800 (2) 0800-1330 (4) 1330-1430 (2)	0600-1100 (3) 1100-1500 (4) 1500-1700 (2)	1600-1900 (4) 1900-0300 (3) 1700-0200 (3)*
Near & Middle East	0800-1000 (1)	0700-1030 (2)	0600-1000 (1) 1000-1300 (2) 1300-1500 (1)	1700-2300 (2) 1800-2200 (2)*
Central & South Africa	0900-1100 (1) 1100-1400 (3)	0700-1200 (1) 1200-1600 (4)	0630-1330 (1) 1330-1800 (3)	1730-0030 (2) 1830-2300 (1)*
South America	0800-1200 (2) 1200-1530 (3)	0700-1400 (3) 1400-1630 (4) 1630-1800 (2)	0630-0800 (2) 0800-1500 (1) 1500-1730 (4) 1730-0300 (2)	1730-0300 (4) 0300-0630 (3) 1900-0500 (2)*
South East Asia	NIL	NIL	0600-0830 (1) 1630-1900 (1)	0400-0700 (1)
Australasia	1500-1700 (1)	0930-1200 (1) 1600-1900 (2)	0630-0900 (2) 0900-1800 (1) 1800-2030 (2)	0100-0400 (1) 0400-0800 (3) 0300-0630 (2)*
Guam & Pacific	1630-1800 (1)	1630-1900 (2)	0600-0830 (1) 1500-1700 (1) 1700-1900 (3)	0200-0700 (2) 0300-0530 (2)*
Japan & Far East	NIL	NIL	0630-1900 (1) 1600-1900 (1)	0300-0700 (1) 0400-0600 (1)*
Greenland	NIL	1100-1530 (3)	0900-1400 (3) 1400-1530 (4) 1530-1800 (2)	1500-0800 (2) 1600-0700 (1)*

ALL TIMES IN CST

CENTRAL USA TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe	0830-1100 (1)	0800-1200 (3)	0600-0730 (2) 0730-1130 (3) 1130-1430 (2)	1530-2000 (3) 2000-0200 (2) 1730-0200 (2)*
Southern Europe & North Africa	0800-1200 (2)	0700-1300 (3)	0600-1100 (2) 1100-1400 (4) 1400-1530 (2)	1600-0100 (3) 1730-0200 (2)*
Central & South Africa	0800-1100 (1) 1100-1330 (3)	0600-1100 (1) 1100-1500 (3)	0600-1230 (1) 1230-1800 (3)	1700-2330 (2) 1830-2230 (1)*
Central America & Northern S. America	1000-1500 (3)	0730-1400 (4) 1400-1630 (5) 1630-1730 (2)	0630-1400 (3) 1400-1700 (5) 1700-0300 (2)	1630-0500 (4) 0500-0800 (3) 1730-0430 (3)*
South America	0800-1500 (3)	0700-1400 (2) 1400-1600 (4) 1600-1800 (2)	0600-0800 (2) 0800-1500 (1) 1500-1800 (4) 1800-0200 (2)	1700-0500 (3) 1800-0430 (2)*
Japan & Far East	NIL	1600-1800 (1)	0700-0900 (1) 1500-2000 (2)	1600-1900 (1) 0200-0800 (2) 1630-1800 (1)*
South East Asia	NIL	1600-1800 (1)	0630-0900 (1) 1500-2000 (1)	0200-0700 (1)
Hawaii	1230-1700 (3)	1100-1800 (4)	1000-1700 (3) 1700-1930 (4) 1330-2130 (2)	2100-0300 (4) 0300-0800 (2) 2230-0600 (4)*
Australasia	1630-1800 (1)	1000-1230 (2) 1230-1400 (1) 1400-2000 (3)	0700-0900 (2) 0900-1730 (1) 1730-2100 (3)	0100-0730 (3) 0300-0600 (2)*

ALL TIMES IN PST

WESTERN USA TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Europe & North Africa	NIL	0700-1000 (2)	0130-0400 (1) 0630-1230 (2)	1530-0030 (1) 1800-2330 (1)*
Central & South Africa	0900-1430 (2)	0630-1000 (1) 1000-1300 (2) 1300-1530 (3)	0600-1200 (1) 1200-1400 (2) 1400-1700 (3)	1600-2200 (2) 1830-2100 (1)*
South America	0800-1100 (3) 1100-1400 (4) 1400-1530 (2)	0700-1300 (3) 1300-1600 (4) 1600-1730 (2)	0600-0900 (3) 0900-1400 (2) 1400-1800 (4) 1600-0300 (2)	1630-0400 (3) 1800-0300 (2)*
Guam & Mariana Islands	1300-1630 (3)	1200-1700 (3) 1700-1800 (4) 1800-1930 (2)	1030-1200 (2) 1200-1800 (1) 1800-2100 (3)	2330-0830 (3) 0000-0700 (2)*
Australasia	1400-1730 (2)	1000-1500 (2) 1500-1800 (3) 1800-1930 (2)	0730-1000 (2) 1000-1800 (1) 1800-1900 (3) 1900-2030 (2)	0000-0700 (3) 0100-0600 (2)*
Japan, Okinawa & Far East	1430-1700 (2)	1400-1630 (2) 1630-1830 (3)	1300-1700 (3) 1700-1900 (4) 1900-2030 (2)	2130-0800 (3) 2230-0700 (2)*
Philippine Islands & East Indies	1430-1700 (2)	1400-1830 (3)	0900-1030 (1) 1300-2030 (2)	0130-0730 (2) 0330-0630 (1)*
Malaya & South East Asia	1530-1700 (1)	1500-1800 (2)	0800-1230 (1) 1500-2000 (2)	0300-0700 (2) 0400-0630 (1)*
Hong Kong, Macao & Formosa	1500-1700 (1)	1430-1800 (3)	1400-1800 (2) 1800-2000 (3)	0000-0700 (3) 0100-0630 (2)*

Symbols For Number Of Days Circuit Predicted To Open:

(1) 1-4 days (2) 5-11 days (3) 12-18 days (4) 19-26 days (5) over 26 days

* Indicates time of possible eighty-meter openings.

The CQ Propagation Charts are based upon a CW radiated power of 150 watts and are centered on Washington, D. C., St. Louis, Missouri and Sacramento, California. These forecasts are calculated from basic ionospheric data published by the CRPL of the National Bureau

PROPAGATION

Forecasts By:
George Jacobs, W2PAJ/W3ASK
607 Beacon Road, Silver Spring, Maryland.

Propagation Conditions, December

The big news during December will be the continued improvement in short wave propagation conditions on the amateur 10 and 15 meter bands, during the daylight hours, as a result of the seasonal increase in daytime maximum usable frequencies and the general increase in sunspot activity.

6 Meters: Only an occasional short-skip type opening expected during periods of sporadic-E or auroral activity.

10 Meters: A considerable improvement is expected on ten meters with fair to good world-wide DX possible during the daytime hours on several days during December and early January. Regular layer short-skip openings between distances of 1000 to 2400 miles also possible on many days during this period.

15 Meters: Fifteen meters will be the best all around DX band during the month. Good daytime DX, with relatively low power, should be possible to most areas of the world almost every day. Regular layer short-skip propagation is expected on most days between distances of 750 and 2400 miles.

20 Meters: Good world-wide DX possible from shortly after sunrise to after sunset, local standard time. Regular layer propagation possible between distances of 250 and 2400 miles during the daytime hours. Because of the longer hours of darkness in the northern hemisphere during December, the band will close considerably earlier than during previous months.

40 Meters: Fair to good DX possible to many areas of the world from a few hours before sunset, through the evening hours, to a few hours after sunrise. Exceptionally strong signals will be noted during the early evening hours on several days during the month. Regular layer short-skip propagation possible almost around the clock.

80 Meters: As a result of minimum seasonal values of ionospheric absorption and seasonally low static levels, fair to good world-wide DX should be possible on several days from shortly after sunset to shortly before sunrise, local standard time. Short-skip openings, as a result of regular layer propagation, will be possible around the clock.

160 Meters: Seasonal propagation conditions improving on this band as ionospheric absorption and atmospheric noise levels decrease. Some DX possible from a few hours after sunset to shortly before sunrise. Regular layer short-skip propagation should be possible during the late afternoon and during hours of darkness.

As a result of the improvement in short wave propagation conditions on the ten-meter band, this month's *CQ Propagation Charts* includes a ten-meter forecast column. To make room for this additional column, the 40 and 80 meter band forecast has been combined into a single column headed "40/80 meters". The 80 meter openings are indicated by an asterisk.

Another change has been made in this month's *Charts* to simplify determining the number of days each month during which a particular circuit is forecast to open. The new numbering system used is directly associated with the number of days that the circuit is expected to open as shown in the box appearing at the end of the *Charts*. The number (4), for example, appearing next to a forecast on a particular circuit indicates that the circuit will be open between 19 and 26 days during the month, etc.

A period of exceptionally good short wave radio propagation conditions is forecast for December 13-19. Based upon the 27-day recurrence tendency of ionospheric disturbances, the period December 20-23 is expected to be moderately disturbed. There is also a good possibility that this disturbance will be accompanied by fairly brilliant auroral displays.

Winter Solstice

On December 22, the *winter solstice* will occur. This is the day on which the sun reaches its most southern point in its apparent travels from northern to southern skies. It is also the time of the year when the actual distance between the sun and the earth is minimum. During this period the sun will be approximately 91,500,000 miles away from the earth.

During the summer months it is as far away as 94,500,000 miles. The nearness to the earth during the winter months results in the sun's ultra-violet radiation sweeping across the ionosphere at more intense levels than at any other time of the year. This results in a very strong *daytime* ionosphere which is able to reflect much higher daytime frequencies than during the other months.

On the other hand, the longest periods of darkness occur in the northern hemisphere during the winter months. During these hours of darkness, ultra-violet radiation from the sun cannot reach the layers of the ionosphere. As a result these long hours of darkness permit extensive de-ionization of the ionosphere to take place. With a weaker ionosphere, night-time MUF values *decrease* considerably during the winter months, and generally reach their lowest values during December and early January.

There is generally a considerable decrease in ionospheric absorption during the winter months resulting in stronger signals during most openings. Atmospheric noise (static) also tends to decrease during the winter months resulting in better signal to noise ratios, especially on the lower frequency bands.

Sunspot Cycle

This month's forecasts are based upon a predicted smoothed sunspot number of 44 centered on December, 1955. The observed monthly Zurich sunspot number for September was 41.9. This resulted in a 12-month smoothed sunspot number of 19.2 centered on March, 1955. The sunspot numbers continue to rise rather rapidly.

Book Review

Several letters have been received from readers during the past few weeks requesting information concerning texts that have been written on the subject of short wave radio propagation, especially those that I would recommend to persons just beginning to have an interest in this fascinating subject. Two excellent texts have already been reviewed in previous columns. *Short Wave Radio and the Ionosphere* by T. W. Bennington was discussed in the December, 1954 column and *Sunspots In Action* by H. T. Stetson in February, 1955.

Another very excellent text on the entire subject of radio wave propagation is *Elementary Manual Of Radio Propagation* by Dr. D. H. Menzel. Dr. Menzel is Professor of Astrophysics and Associate Director of Solar Research at Harvard University. The subject is covered in an essentially simple form so that it can be of use to the beginner as well as advanced student of the subject of wave propagation. The discussion of the physical processes that take place in the ionosphere are explained in simple, clear and descriptive language. The method of predicting *short wave* radio conditions are explained and sample examples are worked out.

Dr. Menzel also devotes chapters to ground wave propagation, propagation at the broadcast (medium wave) and lower frequencies, as well as an excellent fundamental discussion of VHF, UHF and SHF propagation. Methods for predicting propagation conditions in these other frequency ranges are also discussed and several sample examples are given. There are excellent chapters covering tropospheric propagation and VHF propagation effects deduced from weather conditions. While the text itself uses descriptive language, instead of mathematics, to explain certain phenomena associated with wave propagation, a special chapter is devoted to a rather concise mathematical discussion of the theory of ionospheric and tropospheric propagation for those who may be interested in the mathematical approach.

Dr. Menzel's book is especially recommended for those who have an interest in the entire subject of radio wave propagation, and its practical application to communications.

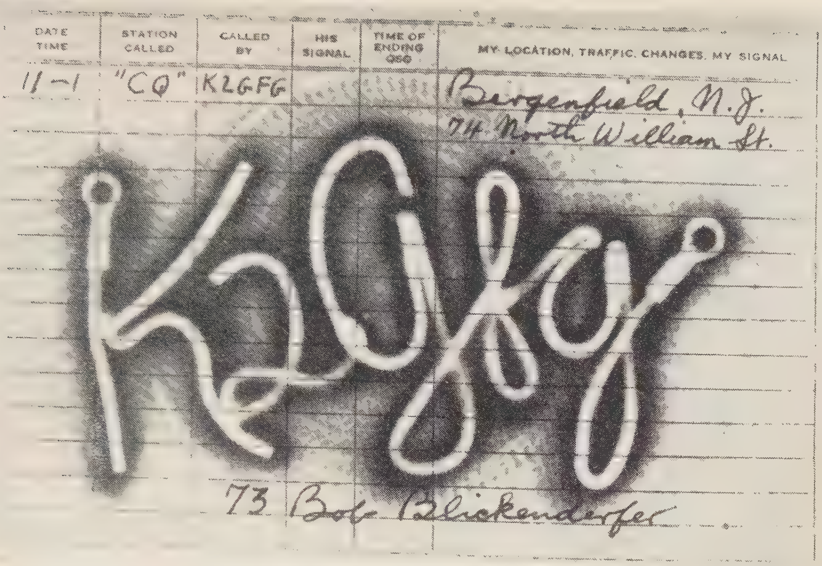
Elementary Manual Of Radio Propagation is published by Prentice-Hall, Inc. New York City and can be obtained direct from the publisher or thorugh your local book dealer.

One Way Skip

W4EDE, among others, has recently asked for an explanation of "one way skip"—the phenomena that is occasionally observed when stations from a particular area can be heard, but not worked, when the power being used is about the same level at both ends of the circuit.

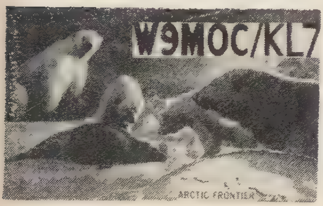
Considering equal radiated powers at both ends of the circuit, (where radiated power is equal to the power into the antenna multiplied by the power gain of the antenna as compared to a reference half-wave dipole, a half wavelength above ground), the laws of reciprocity are generally considered to hold true for radio propagation. That is to say, a radio signal going for example from Washington, D.C. to Buenos Aires should be affected by the ionosphere in exactly the same degree as the signal travelling the reciprocal path from Buenos Aires to Washington. Actually, as far as signal strength goes, this is usually always true. In our example, the signal received in Washington from Buenos Aires should equal the strength of the signal received in Buenos Aires from Washington. However, while the laws of reciprocity do usually hold true in the case of signal strengths, the intelligibility of the signal, that is whether it will be heard or not, depends not on the signal strength alone, but upon the *signal to noise ratio* at the input receiver. Naturally if man-made interference exists on one end of the circuit and not on the other, the circuit will be a one-way affair despite equal signal levels. Assuming, however, that no man-made noise exists at either end of the circuit, atmospheric noise levels (static) may be responsible for one-way circuits. Atmospheric noise levels throughout the world vary considerably with

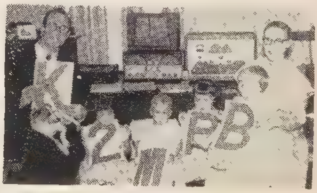
[*Continued on page 112*]

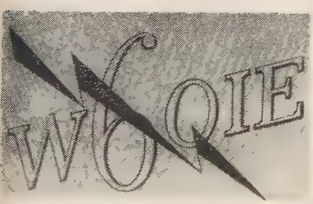


Monthly QSL Contest Winner

and runners up







I'm afraid our reproduction doesn't quite do justice to the fascinating card sent in by K2GFG, winner of this month's contest. Printed on a regular mobile log sheet by an airbrush process, details of which have not been revealed to us, the "K2GFG" stands out beautifully from a purple background design. Obviously the letters are bent from about a #12 wire, with joints soldered and lugs attached to the extremities. Just picture how easy and how much fun it would be just to lay the wire frame on your card and then give it a few artistic shots with the airbrush—or colored spray-can paint—every card an individual design, if you wish—or combine different colors. Getting inspired?

Honorable Mention must go to W5LV, W9YSM, W5RFF, and HK3FV. W5RFF will surely go broke if he sends his out to everyone he works—the silvered letters stand out in fine detail on a bona fide etched circuit board. HK3FV has red and blue flocked (fuzzy) letters on a thin card of real wood. W5LV and W9YSM have original and interesting cards which we are unfortunately unable to reproduce for you without switching to First Class mailing of the magazine, as those of you who have QSL'ed them already know.

The prize (you don't know? where have you been?) is a 2-year subscription to *CQ*.

Nothing New Under

Norman R. McLaughlin, W6GEG
1513 Harrison Avenue
Fresno 5, California

Believers in the saying, "There is nothing new under the sun" will find great satisfaction in the history and development of single sideband suppressed carrier transmission and reception. Contrary to current thinking, prompted no doubt by the wave of interest in SSSC in amateur circles, this method of communication is not new. In fact, it is older than the average licensed U. S. radio amateur.

Back in 1914 a fellow by the name of John R. Carson was working for the American Telephone and Telegraph Company. He was assigned to a project that would ultimately bring about trans-oceanic radio telephone service, span the Atlantic and later the Pacific.

In studying the problems surrounding such a service Carson concluded a number of things that were highly debatable in those days. It seems incredible that these conclusions which are basic today were subjects of good arguments some forty years ago.

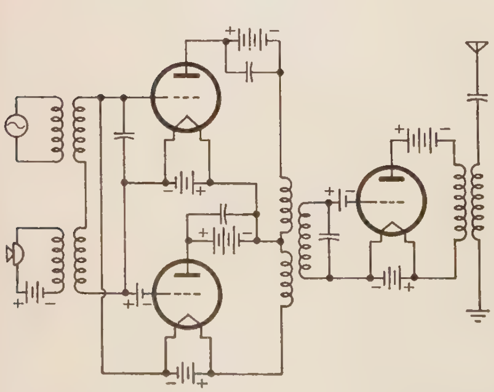


Fig. 1. S.S.S.C. Transmitter, patent ♯1,449,382.

Among Carson's conclusions were: (1) of the total power transmitted, the greatest amount of that power is in the carrier which transmits no useful information and (2) the other components of this transmitted power are two "voicebands" which carry identical information.

Outside of the Bell System, few radio men put much in Carson's conclusions. Ideas as to what took place when a wave was modulated varied considerably as did ideas as to what a modulated wave consisted of. Most denied the existence of sidebands and others believed that the carrier was a must.

Perhaps the fact that modulated oscillators were the principal means of r-f power generation in those days contributed to some of the confusion. Many radio men felt that the frequency shift that was caused by modulation was essential to it. Some phone men today would seem to subscribe to that theory.

The Bell people, however, could see no necessity for the carrier shift (low grade FM, today). They developed their systems around the principle of a fixed carrier frequency.

Since the Atlantic had not been spanned by voice as yet, the distances involved looked formidable. Power requirements to do the job appeared to be of great magnitude. So much so that every watt of power had to produce since power limitations in the middle teens were considerable as compared to today.

Carson pointed out that by eliminating the carrier component in the transmitter the r-f power requirements would be cut in half. He devised a "balancing out modulator" to remove the carrier. High frequency men will recognize Carson's "balancing out modulator" as a push push frequency multiplier where the grids are in pushpull and the plates are in parallel.

Eliminating the carrier, Carson showed meant that with the same prime source of power the r-f input to transmitters could be

The Sun

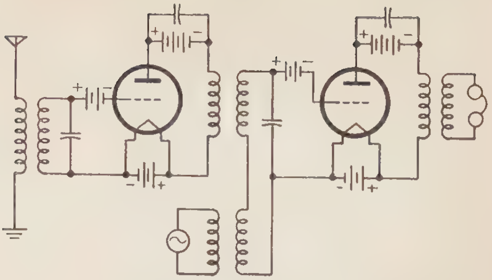


Fig. 2. S.S.S.C. Receiver, patent #1,449,382

doubled. This power doubling could be achieved, he said, without loss of any intelligence in transmission. In fact, he showed that it would be impossible, so far as quality of transmissions was concerned, to tell whether the carrier was removed or present.

To do this took a little more than just "a balancing out modulator." It meant that a different means of demodulating the signal had to be developed. Carson did the obvious by having the receiver itself provide the missing carrier. Since the amount of power so generated was infinitesimal compared to the power in the carrier that had been removed from the transmitter, this carrier elimination was not just a case of passing the buck from the transmitting to the receiving end. That fifty percent power saving was real.

Eyeing the duplicating sidebands, Carson saw another opportunity to save power. Since both sidebands were saying the same thing at the same time, he reasoned, eliminating one of them would not destroy nor diminish any of the intelligence transmitted.

So he set about to eliminate one of the "voicebands." This was done by means of a filter in the transmitter which was aided and abetted by an antenna system that would radiate only a small amount of the unwanted "voiceband." If the latter seems a little vague, remember that these experiments were conducted on the "long waves."

Now, Carson had saved another twenty-five percent of former r-f power input. This twenty-five percent coupled with the fifty percent he saved by removing the carrier meant that he could now do the job with but one quarter of the original r-f input!

As though these figures are not significant in themselves, apply these percentages to hundreds of kilowatts per hour and they really stand out. In a sense however these savings would not be real. Instead of running on one fourth the power, that power would be increased four times enhancing chances for success of the radiotelephone project by at least that amount.

These savings did not stop here, Carson pointed out. By removing one "voiceband," the bandwidth required by the transmitter was cut in half. Since frequencies were every bit as scarce in those days as they are today, this was a real windfall.

Still another bonus was attached to the elimination of the surplus sideband. Carson demonstrated that as he reduced the bandwidth of the transmitter, he also could narrow the passband of the front end of the receiver. So doing would eliminate at least one half of the noise.

Noise reduction means increased circuit usage time. To a communications service, circuit time is like money in the bank. This noise reduction with its increased circuit time was about as important as any other phase of Carson's developments.

By December 1, 1915 Carson had the situation well enough in hand to submit his ideas to the U. S. Patent Office. Figure 1 shows what he had in mind on the transmitting end. Figure 2 shows how he proposed to demodulate this new type of radio transmission.

For one reason or another (World War I doubtless had something to do with it) Carson's patent, modestly called a "Method and Means For Signaling with High Frequency Waves," was not granted until April 27, 1923 It is patent number 1,449,382.

Of Carson's invention a recent Bell System publication said:

"This invention has proved of inestimable value in carrier development since that time. Besides making twice as many channels available over a frequency band, it also reduces the noise and load on repeaters. The amount of power required for single-sideband carrier-eliminated transmission comes out to be only about one eighth of that required for double sideband transmission with carrier retained, for the same signal to noise ratio. . . . Without it the first trans-oceanic service could not have been established in 1927."

RTTY

reported by

Byron Kretzman, W2JTP

9620 160th Ave., Howard Beach 14, N. Y.

AMATEUR RADIOTELETYPE CHANNELS

National, FSK (mark frequencies; space 850 cycles lower) 3620, 7140, 27,200, 29,160, 52,600 kc.

National, AFSK (2125 cycles mark; 2975 cycles space) 27,200, 147,960 kc. calling & autostart 144,138 kc. repeater & duplex

California, AFSK 147,850 kc. calling & working

Washington, D.C. AFSK 147,960 kc. calling & autostart 147,495 kc. working

Chicago, AFSK (FM) 147,700 kc. calling & working

Detroit, AFSK (FM) 147,300 kc. calling & working

New York, AFSK (FM) 53, 160 kc. **(AM)** 147, 960 kc. calling & working

CHICAGO—Last month we gave a rough outline of the RTTY Meeting that was to be held in Chicago October 2nd and 3rd in connection with the 11th Annual National Electronics Conference. This month we can give you the facts, and I mean in fine detail. As previously reported, this gathering of the clan was the brain-storm of Boyd Phelps W0BP Bob Weitbrecht W9TCJ, Burt Cottrell W9OCV, and Joe Juel W9BGC. The whole Chicago gang then pitched in to make it an outstanding clam-bake.

Originally, the idea was to begin festivities Monday, October 3rd, but as Monday was a regular working day it was decided to begin on Sunday, October 2nd, to enable the visiting firemen to tour some of the local RTTY ham shacks. As it turned out, this was a wonderful idea, and consequently we saw much more of Chicago than we would have otherwise. Much thanks go to those who provided us transportation for these visits.

Arriving Saturday afternoon, I called W9BGC and found that W2JAV and W2BDI had also arrived so I headed for their hotel where we started our own small-sized hamfest. Phil Catona, W2JAV, had his 425 cycle

RTTY Meeting dinner at the Hotel Graemere in Chicago.

Waiting for dessert: W6ZBJ, W6AEE, W2JAV, W2BDI, W9TCJ, W5JBW, W9SPT, and W9JBT; left to right.

tuning-fork oscillator and his audio-deviation frequency meter with him for the meeting program, so we had a pre-view performance. (Compared his tuning fork with mine and found only a couple of cycles difference!) Amos Burkett W5JBW, Larry Pratt W8GRL, and George Boyd W9SPT also showed up at this early gathering. After dinner we were met by Bob Paculet W9JBT who, with George, drove us out to Joe Juel, W9BGC, in Northlake. We stopped off at W9SPT and saw the Chicagoland 2-meter FM net in operation. At W9BGC we were treated to another fine view of a Chicago RTTY ham shack. With Joe's understanding wife providing the coffee and sandwiches we gabbed until 2:30 a.m. (Phil's story of getting his tie caught in a Model 12 took top honors.) Heading back to the hotel, I thought that this was really an auspicious beginning.

Sunday morning Ray Morrison, W9GRW, picked up some of us and drove us out to see W9KLB where we met Al Witt and were given a demonstration of 2-meter RTTY with an indoor antenna moved around the room like a floor lamp to find the best position for the station being worked! Al then joined us for a visit to the famous basement of W9GRW. We were not disappointed. It out-waynes W2NSD! Ray, by the way, is the machine expert of the midwest and has been of tremendous help to those with problems.

Formal start of the RTTY Meeting was at 1 p.m. at the Hallicrafters plant. Right after registration we had a chance to look around and see some of the exhibits. In operation was the new Teletype Model 28 and several Kleinschmidt machines. George Boyd, W9SPT, had his electronic distributor set up and in operation. Bob Weitbrecht, W9TCJ, also had his electronic distributor winking its neon eyes at us.

Joe Juel, W9BGC, called the meeting to order and introduced the Master of Ceremonies, Boyd "BeeP" Phelps, WØBP. BeeP briefly covered the background of ham RTTY and pointed out that radioteletype was ". . . the last frontier of ham radio where hams still build their own specialized equipment." WØBP introduced Bob Weitbrecht who described his new heterodyne FSK exciter and explained how drift was held down for FSKed VFO operation on 80-, 40-, 20-, and 15-meters. Bob was followed by Phil Catona, W2JAV, who demonstrated his audio-deviation frequency meter, one of the most versatile pieces of RTTY gear that we have ever seen. Incidentally, it was described in the Feb. '54 *RTTY* bulletin.

Bruce Meyer, WØHZR, described his phase-

Most of the planning committee for the Chicago RTTY Meeting

Bob Weitbrecht's (W9TCJ) corner at the RTTY Meeting. The rack unit with the HRO dial is his new heterodyne exciter.

shift high speed tuning indicator. This very simple device uses a 2″ oscilloscope tube and connects directly to the receiver audio output. It is a vast improvement over the usual 'scope tuning indicator, showing not only the correct tuning of the receiver, but the amount of shift that the signal has! Bruce has promised us the details for *CQ* in the near future. Watch for it.

Ray Morrison, W9GRW, answered questions from the floor regarding mechanical problems with the Model 26. (Next month's column will carry his "hook-up" data for the 26.) Ed Clammer, W2BDI, briefly described his i-f type of converter that works from the 50 kc. i-f amplifier of his receiver. BeeP then, with the help of W9TCJ, demonstrated narrow-shift RTTY, using the germanium diode tone-quadrupler built by W9TCJ. This enables the reception of a station using 212.5 cycle shift with the ordinary 2125/2975 cycle TU. Phil Catona, W2JAV, then ran his special test tape through BeeP's tape recorder and TU to a 26 machine. This tape has "grass" noise mixed with the AFSK signals in ratio steps of 1 db. How many db. into the noise you can go before printing errors then is a measure of the effectiveness of the converter under test. This is a very handy method of comparing converters.

Fritz Franke of Hallicrafters commented on the i-f type of converter primarily designed for use with the SX-88 and described in the Nov. '54 *RTTY* bulletin. He also described the quality control methods used in the manufacture of the 50 kc. coils, particularly the "notch filter" that is in the SX-100 receiver. These coils are very useful to the RTTY builder and experimenter, and they will be made available to us from Hallicrafters in the near future, according to Fritz. The meeting then wound up with a quick Fritz-conducted tour of the SX-100 and S-38 production lines.

Sunday night the RTTY banquet was held at the Hotel Graemere. There were no long-winded speeches—just a dog-gone good steak dinner and the opportunity to rag-chew with our RTTY contacts in person.

Monday at 1 p.m. the group gathered at the Teletype Corporation plants where we were met by Burt Cottrell, W9OCV, who arranged the extremely interesting tour of Teletype machine production lines. We saw a battery of 25 Model 15's being run-in, their carriages performing in perfect unison—like a line of "Rockettes." We saw the new Model 28's also being run-in, but racing madly at 100 words-per-minute. After our tour of the production lines we were taken to a demonstration room where a projection-Teletype machine was set up to show copy to crowds. And long to be remembered was the Model 28 that played "Star Dust" and other tunes on its bells! Of particular interest was the 600 w-p-m (yes, I said 600!) tape punch and tape reader system with its electronic equipment.

All in all, the Chicago RTTY Meeting was a huge success. On the registration sheets we found the following calls: W2BDI, W2JAV, W2JTP, W5JBW, W6AEE, W6ZBJ, W7HRC, K8FDO, W8DLT, W8GRL, W8PHG, W9ABC, W9AKM, W9BGC, W9BSG, W9DJE, W9EAI, W9EID, W9FGI, W9GDZ, W9GRW,

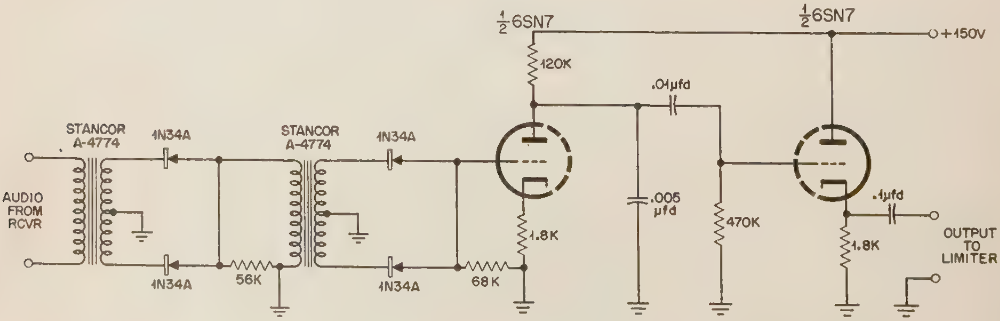


Fig. 1. Tone Quadrupler circuit.

W2JBW, W8GRL, Chicago host W9SPT, W2JAV, and W2BDI.

W9GVN, W9IQS, W9JBT, W9KLB, W9KUJ, W9LDH, W9LKK, W9LSY, W9MDQ, W9MPE, W9MVJ, W9NGX, W9OCT, W9OKS, W9OPI, W9QBH, W9SPT, W9TCJ, W9THE, W9THG, W9TNH, W9UWN, W9UXS, W9VOK, W9WNR, W9ZGP, W0BP, W0HZR, and W0LKL.

Narrow Shift

As reported on page 47 of Sept. '55 *QST*, the ARRL petitioned the FCC July 6, 1955 to change our rules to permit shift of anything less than 900 cycles. Subsequently the FCC issued DOCKET NO. 11501, "Notice of Proposed Rule Making." According to paragraph 6, the last day for filing comments was November 28, 1955. We hope all you RTTYers filed comments in support of the proposed amendment. The legal advantage of experimenting with narrow shift will greatly facilitate standardization of our operation. Suggested standards have been 60, 120, 170, and 212.5 cycles, in addition to our present 850 cycles. Advantages of narrow shift are mainly reduction in QRM due to decreased bandwidth and reduction in selective fading.

Fig. 1 shows an uncomplicated circuit that permits us to utilize a *transmitted* shift of 212.5 cycles, one-fourth our present 850 cycle standard, *without requiring a new terminal unit*. This gadget was built by W9TCJ at the suggestion of W0BP and was demonstrated at the Chicago RTTY Meeting. Operation requires that the receiver be tuned to produce roughly 531 cycles mark and 744 cycles space. Its output is fed to this "Tone Quadrupler" unit. Both tones are multiplied four times to 2125 and 2975 cycles and fed into a standard TU. Simple and neat, huh?

15-Meters

Now that the sun-spot cycle is swinging toward our favor, 15-meter activity is springing up. Of course we have the same problem of legal QRM from foreign commercials that we have on 40- and 80-meters, but this band holds quite a bit of promise for some long-haul RTTY work.

W6AEE reports that some fairly good hops are being made by such careful observers of band openings as W6CG, W6LDF, W7LPM, W8BL, W8BYB, W8GRL, W8ZM, and W0JRQ.

6-Meters

The Los Angeles CD gang, about 30 stations, is on 6-meters with AFSK and they have not had too much trouble with TVI, according to W6AEE. They have the same channels as New York City, plus No. 3 in Santa Barbara, 8 and 10 in San Diego, and 6 in Tijuana. "Soo—guess it *can* be done!"

Bob Hajek, W9QBH, of Riverside, Illinois, says many fellows in his area are operating on 53.4 and 53.6 Mc. FM. They are set up for voice or AFSK. Vertical polarization is used, as they also have mobiles in operation on those channels. Motorola 30-watt sets are mostly used; however, Bob has built a final using a pair of 4-125A's which runs around 700 to 800 watts. He is keeping an ear out for the New York fellows on 53.16, but hasn't heard anyone from that area as yet.

Battery of teleprinter machines in operation at the Chicago RTTY Meeting. That's Bob Calhan, W9VOK, seated at the machine.

Phil Catona, W2JAV, and Ray Morrison, W9GRW.

Across the Nation

Maybe this section should be entitled, "Around the World." The mail bag this month carried many letters from outside the U.S. For instance, Wayne Cooper, HR2WC/YN-1WC/W6EWC, writes from La Lima, Honduras, requesting availability of Signal Corps RTTY instruction books. (This is being checked.) For the time being, HR2WC will be on SSB. VE7EP is on RTTY from Vancouver, but VE7DV in Victoria, B.C., is having difficulty in getting started. Isn't there *anybody* near Victoria that can give VE7DV a hand with his Model 26? Larry Ching, KH6ZD, writes from Honolulu that he has ordered a Model 26 and needs some dope on modifying his 32V2 for FSK operation.

The one thing that stands out in the RTTY branch of our hobby of amateur radio is that some things *have* to be built, unless we have enough dough to buy commercial gear which is really expensive and not always satisfactory for our purpose. And what makes it stand out is that the average RTTYer *enjoys* building as well as operating his equipment. As a result, your RTTY editor gets letters from hams who are just getting acquainted with RTTY, hams who are of the "do-it-yourself" type, such as Bill Lieske, W7IPI. Bill says that we need to publish more basic radioteletype information, run some construction articles, and cover some of the "do's and don'ts" of RTTY operation from the FCC point of view. This, Bill, is exactly what we are trying to do. If you check, you will find that *CQ* is running more RTTY material than any other regular radio or electronics magazine.

Harold Roth, W0LFH, writes from Algona, Iowa. He can hear no 2-meter signals in his area, so he is going to have to get started right away with FSK on 80-meters. This shouldn't be too hard for Harold. He has been hamming for over 30 years. From the pictures on his QSL card, it looks as if he likes to build, too.

Alex MacDonald, W2PRB, is now operating from his home in Massapequa, Long Island, and is putting in (at W2JTP) a good signal. Not as good, of course, as when he was operating from that sky-scraper, but good.

Pete Selmer, W2TLY, is in his new home in Farmingville, way out on Long Island. He is on 2-meters, but it's quite an effort for the old 522 to make it to Manhattan, or even Queens. Nothing wrong with the 522 an extra 50-feet of antenna height won't cure, Pete! Eventually Pete will be on 80 and 40 as he now has a bit more room for antennas than he had in the Bronx.

ARRL

Bill Auld, W2DXD, back from India, has been appointed OBS, and with his tape equipment has been running official ARRL bulletins on 2-meters from Westwood, N.J. This is exactly what Ed Handy W1BDI, the ARRL Communications Manager suggested, as reported in last month's column. While out in Chicago many comments were heard to the effect that it would be much better if W1AW ran their bulletins (taped RTTY) on 80, 40, and 20 at scheduled times with their kilowatt transmitters and rhombics. If this is what you want, fellows, let your SCM and Division Director know about it.

Comments

As mentioned in a previous column, all the RTTY stations heard on the ham bands are not amateur radioteletype stations. Those stations can be identified because the *amateur* RTTY stations call and sign with the International Morse Code, as required by the FCC. Generally speaking, the other RTTY signals you hear continuously are foreign stations operating there legally, under international agreement.

Those of us who work on 40-meters know also that all of the QRM isn't RTTY, too. While the calling and working frequency of 7140 kc is listed, actual operation is necessary slightly off this frequency. It has been suggested that operation be shifted to 7150 kc. As the Novice Band is 7150 to 7200 kc., RTTY operation on 7150 would serve as a handy band-edge marker for the Novice. Little or no QRM would be caused to the Novice because most of them wisely steer away from band-edge operation. Let's have some comments from you fellows regarding this change.

The heartfelt thanks of all of us who attended the Chicago RTTY Meeting go to the fellows out there for their hospitality. All the Chicagoland gang, especially the Planning Committee, W9BGC, W9GRW, W9JBT, W9SPT, W9OCV, W9THE, W9TCJ, and W0BP; all deserve a great deal of credit for the huge success of the affair.

Merry Christmas and a Happy New Year to all from W2JTP!

CQ World Globe

How would you like to have this beautiful sphere for your very own? No, not the one with the toupee, the larger one, behind it. It's in full color, and on the surface of it appears evidence of much worldly knowledge, apparent also but more inscrutably on the smaller one which, however, does not spin as easily. Forget about the smaller one, it's patented and the only one in captivity, belonging to our Novice Editor Walt Burdine, W8ZCV.

But for the large globe, Hoo Boy! a method of mass production has been worked out by the Hammond Co. that will astound globe connoisseurs the world over. The *CQ* World Globe is available to you for (sit down, take a deep breath and count ten) only $19.95, with a year of *CQ* into the bargain.

—K2OLK

We first announced the availability of the Hammond World Globes in the October *CQ*. Since then hundreds of our readers have ordered the globes and are using them in their shacks. The response has been unanimous: not *one* globe has been returned and we have letters of appreciation from dozens of delighted users.

I have displayed a sample of the globe at several ham club meetings and hamfests . . . the reaction again was terrific. The fellows are anxious to get globes for their shacks and for their kids.

XYL's take note: Do you want the OM to flip this Xmas? Yep, you guessed . . . a globe. Before you get out the check book and send for one I recommend that you shop around a bit and see what the going price is on the larger globes. When you have regained your breath you will appreciate what a tremendous bargain our 18" globe is. We send it to you postpaid for only $19.95 and give you a year's subscription to *CQ* in addition.

Send for it now. If the OM isn't delighted . . . if he is willing to part with it . . . send it back for a full refund. OK? There you have it, a 14-carat gold-plated money-back guarantee. Patronize home industry. Send your money order, check, or anything else negotiable to us right now so we can merrify your Xmas.

—W2NSD

CQ Magazine
67 W. 44 St.
New York 36, N.Y.

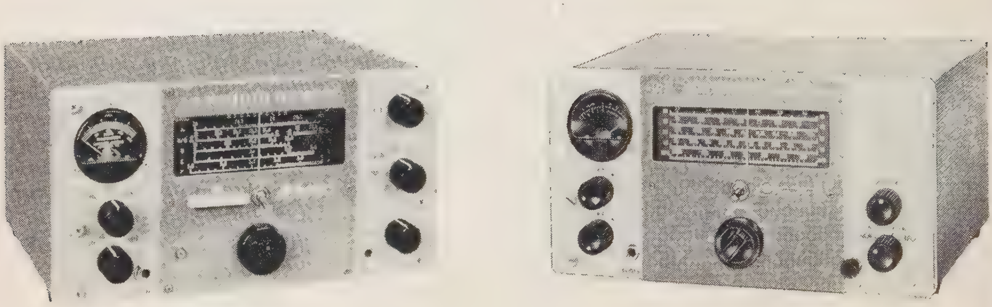
Kindly send me the CQ World Globe plus a one year ☐ new ☐ extension subscription to CQ. Enclosed is ☐ check ☐ money order for $19.95.

Name____________________Call__

Address____________________

City_______________Zone______States__

the Harvey-Wells Twins



the T-90 and the R-9

The T-90 Bandmaster Transmitter

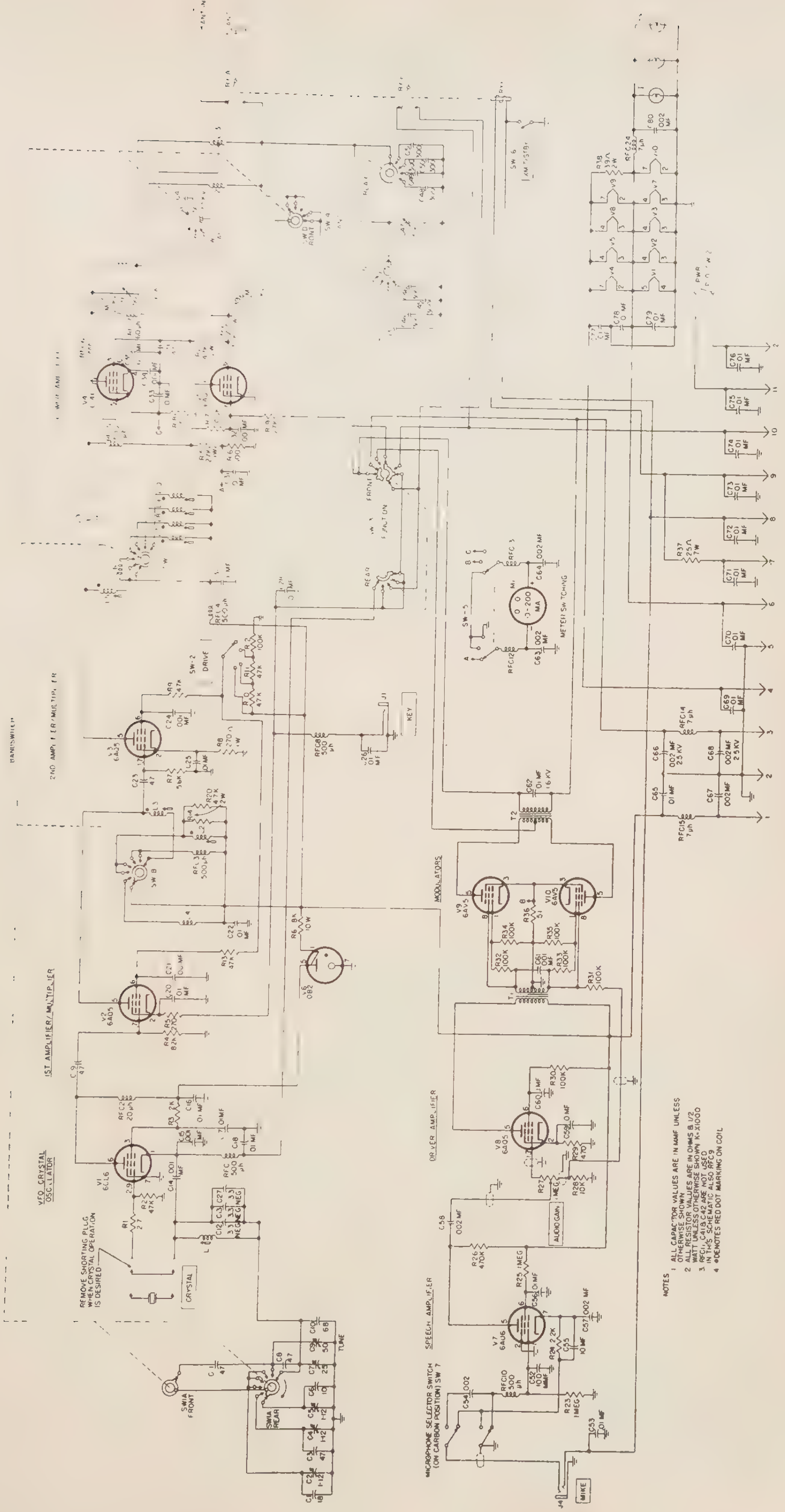
The first impression you get when you look at the *T-90* is, "My, how small it is . . . it is small enough to be just right for mobile use." The Harvey-Wells gang already thought of that and it apparently is no accident. From just about every aspect the rig has been engineered for flexible mobile use, and is of course just as handy for home operation as a result.

A good example of the mobile operation slant of the rig is in the illuminated dial and meter. If you have ever tried to tune up a rig while driving you will appreciate the brilliant rear illumination of the meter (plate, grid, and modulator currents with a front panel switch to select) which makes the numbers practically jump right out at you. The merest glance and you can see what is going on. The same goes for the VFO tuning dial, a slide-rule type dial which spreads the bands out beautifully so you can QSY quickly and with assurance to any other spot in the band just by the dial reading.

The rig is rated at 75 watts on phone and 9 watts on CW. This is quite a bit better than th usual 35 watts that most of us have had t stick with for mobile operation. Even with good mobile antenna we need a bit more soc from the mobile rig to fight our way throug the rising hordes on 10 and 15 meters, or th fantastic mish-mash on 40 and 20.

Tested in the Home

Since my present mobile rig is pretty we established and will have to stay until I ge a new car the *T-90* went into the ham shac at home and was set up with the Harvey-Well 110 Volt AC Power Supply. After havin spent several years as a home constructor c rigs there was a definite sense of excitemer and pleasure at having only to connect th power plug, antenna, antenna to receiver, an receiver disabling circuits in order to get o the air. Amazing, on the air in less than te minutes. They supplied all of the connector involved and the instruction book didn't eve


VFO CRYSTAL OSCILLATOR
1ST AMPLIFIER/MULTIPLIER
2ND AMPLIFIER/MULTIPLIER
BANDSWITCH
SPEECH AMPLIFIER
DRIVER AMPLIFIER
MODULATORS
MICROPHONE SELECTOR SWITCH (ON CARBON POSITION) SW 7
REMOVE SHORTING PLUG WHEN CRYSTAL OPERATION IS DESIRED
CRYSTAL
TUNE
SW1A FRONT
SW1A REAR
SW-2 DRIVE
SW 8
SW 6
SW-5
METER SWITCHING
KEY
MIKE
AUDIO GAIN
V1 6CL6
V2 6AQ5
V3 6AQ5
V4
V6 0B2
V7 6AU6
V8 6AQ5
V9 6AV5
V10 6AV5
M1 0-200 MA
T1
T2
J1
J4
NOTES
1 ALL CAPACITOR VALUES ARE IN MMF UNLESS OTHERWISE SHOWN
2 ALL RESISTOR VALUES ARE IN OHMS & 1/2 WATT UNLESS OTHERWISE SHOWN K=1000
3 RFC1, C41 & 42 ARE NOT USED IN THIS SCHEMATIC ALSO RFC9
4 ⊕ DENOTES RED DOT MARKING ON COIL
1
2
3
4
5
6
7
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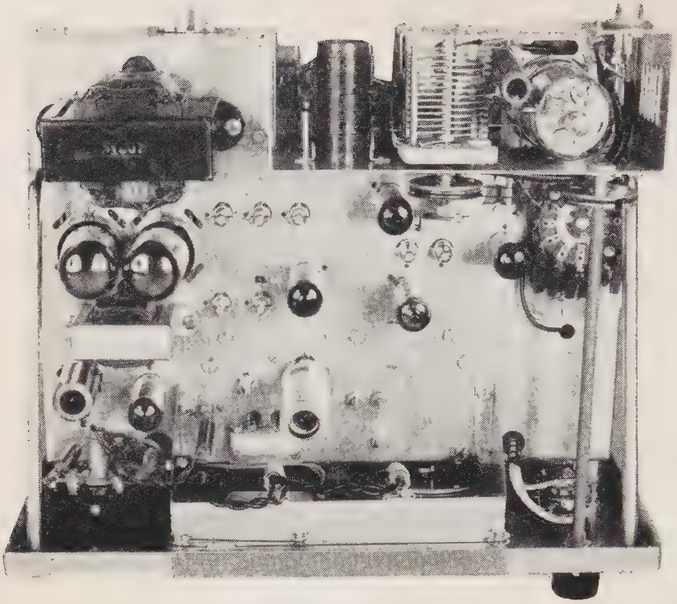
9
10
11
12

T-90 transmitter schematic

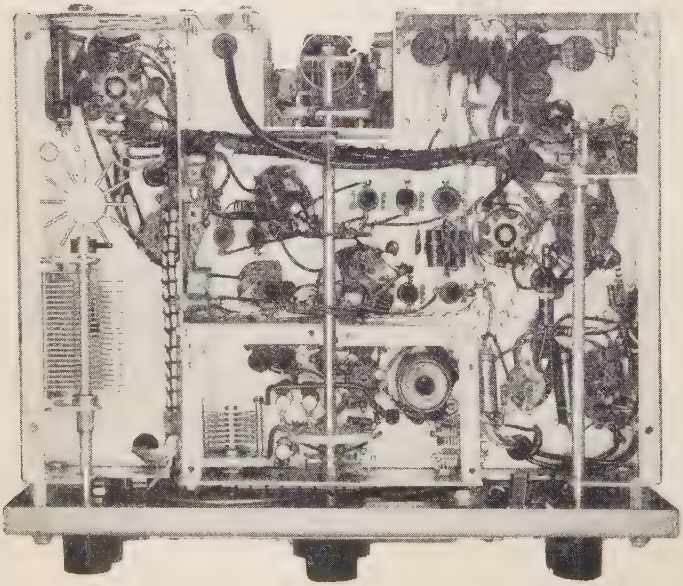


T-90 Transmitter chassis, top view

confuse *me*.

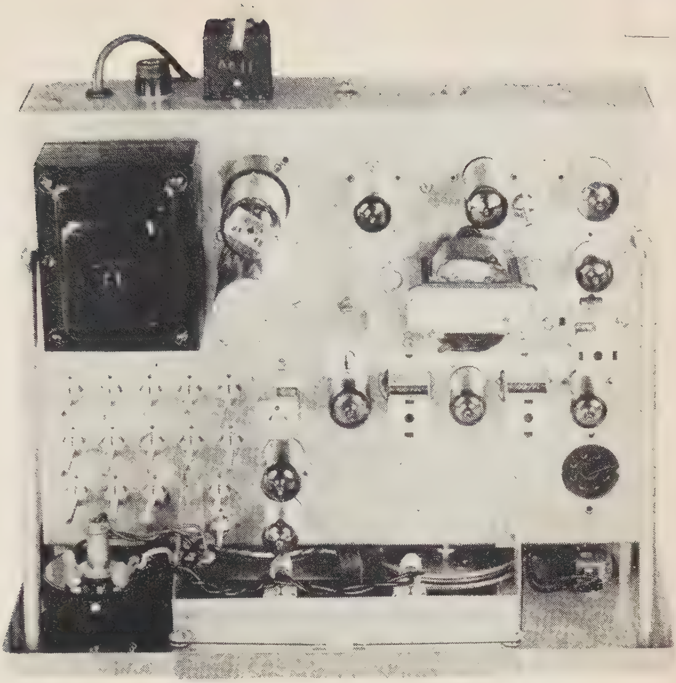
The antenna available was a 75 meter folded dipole hung in the trees out back of the house. As I started to load the rig I found that they had cleverly put a switch on the antenna loading control so that with each revolution of the control another condenser was switched into the circuit, making it possible to run from almost zero up to 2700 $\mu\mu$fds which should be able to balance out the reactance of almost any antenna. I loaded up the rig on all bands without difficulty without changing the antenna. I tried it out on the air and found that it was doing a remarkable job for such a poor antenna situation. Contacts were made with skip stations on all bands, 10 thru 80, with no difficulty.

On 75 meters I hooked up with WIZHO (Pearl) in Whitefield, N. H., whom Jim and I had visited a few days before while on our 2-meter "DXpedition" to Mt. Mansfield, Vermont. Just for comparison I turned on my kilowatt rig and switched back and forth between them. Pearl said that the *T-90* was



T-90 Transmitter chassis, bottom view

R-9 Receiver chassis, top view



readable and the KW was not. This stemmed from the excellent modulation of the *T-90* as compared to the 80% modulation of my big old kilowatt. But it got through. I have since held many contacts right through the QRM on 75 and have yet to lose anyone, even in the peak operating times.

One complaint with some of the commercial transmitters today is that you have to hook up an external antenna relay and usually have to provide your own receiver disabling circuit. The inclusion of these in the *T-90* are an important benefit.

CW men will appreciate that the *T-90* can be keyed and has a clamp tube (6AQ5) in order to protect the 6146 final amplifier. The note from the rig is clean and T9. The rig is either VFO or crystal operated with the crystal normally out of sight behind a small access door in the front panel.

There are three different ways of operating the rig. There is a regular push-to-talk contact on the mike jack (PL-68), a toggle switch on the front panel, and a separate contact on the power plug for remote operation.

Looking Over the Features

The filament wiring of the *T-90* is cleverly designed to operate from either 6 or 12 volt car systems since the tubes are wired in a series-parallel arrangement.

Just about any microphone will work with the rig since there is a small slide switch inside to change the input characteristics to match a crystal, dynamic or carbon microphone. The gain control is on the front panel, but is a screw driver adjustment since it is seldom touched after being set.

My TV set usually folds up and quits under the slightest attack of external r.f., but the *T-90* left it unperturbed. I am inclined to give credence to the manufacturer's claim of TVI-proof operation. —W2NSD

The R-9 Bandmaster Receiver

Now take a look at the receiver. No, those aren't two *T-90* transmitters at the head of this article. The one on the right is the compact little double conversion receiver, the *R-9*. Housed in an identical cabinet (12⅜″ wide, 10½″ deep, 6¾″ high), it draws a double take from most people seeing it for the first time alongside the *T-90*. The 5-band slide-rule dial, the meter (in this case an S-meter), the bandswitch and coaxially-mounted tuning knob, and the transmit-receive switch are mounted exactly as on the *T-90* front panel. The separate R-F and A-F gain controls, the On-Off switch, and the AVC-ANL-MAN-BFO switch occupy the same positions as four symmetrically-mounted controls on the transmitter. The tiny Pitch Control knob was sneaked in next to the AVC-etc. switch. Symmetrically opposite, on the left side of the front panel, is the phone jack.

A 110-120-v. 50-60-cycle power supply is built in, using a 5Y3 rectifier plus an OA2 for voltage regulation of all oscillator stages (first converter, second converter, and BFO). 8 more tubes complete the layout:

6BJ6 — First R.F.
½ 6U8 — First Mixer } first i.f. 1600 kc.
½ 6U8 — Mixer Osc.
½ 6U8 — Second Mixer } second i.f. 260 kc.
½ 6U8 — Mixer Osc.
6BJ6 — First I-F Amplifier
6BJ6 — Second I-F Amplifier
6AL5 — Detector and Noise Limiter
½ 12AX7 — First Audio
½ 12AX7 — BFO
6CM6 — Output

By removing a jumper Jones Plug connector from the rear of the receiver chassis, and connecting a suitable vibrator or dynamotor power supply, 6- or 12-volt operation is possible. Harvey-Wells manufactures a vibrator power supply for this purpose which will operate on either 6 or 12 volts d.c., the *VPS-R9.*

The speaker for the *R-9* is mounted in a separate speaker enclosure and connects thru a jack on the rear apron of the receiver chassis. A more compact speaker is available for mobile use.

The coaxial antenna input is designed for 50-ohms input impedance, to match the line from a mobile antenna, a coaxial or groun plane antenna, a center-fed half wave, or th line from another companion unit, the 2 *Match,* a combination antenna matching un (10 to 2000 ohms!) forward-reflected pow wattmeter, R-F wattmeter, and dummy load.

An advantage in selectivity and convenienc of operation is obtained by limiting coverag to the ham-bands only. This might be a di advantage if the *R-9* were to be an "only receiver (no i.f. for VHF converters, no WW no [horrors!] broadcast band), but for th purpose for which the receiver was designe ham-band reception only, the fixed calibr tion slide-rule dial makes for convenient o erating, easy bandswitching.

SSB reception is good (therefore CW also with the voltage-regulated BFO putting out nice stable signal.

I suppose we will all continue to hope fo $500 receiver performance from $150 r ceivers. We must regrettably admit that th is a problem the receiver manufacturers haven licked yet, though with the unveiling of th *R-9* Harvey-Wells shows us they're in ther struggling with the rest of them. Maybe, som day—Ah! me! In the meantime, performanc of the new *R-9 Bandmaster Receiver* compare favorably with other receivers in the $10 $200 class—and its design makes it a ver attractive mate for the nifty *T-90.*

—K2OL

Grounded Grid Tune-Up Tip

Norman R. McLaughlin, W6GEG
4143 Muirfield Road
Los Angeles 8, Calif.

Since the driver stage "looks through" a grounded grid amplifier into its load, the importance of keeping the grounded grid stage loaded cannot be stressed too greatly. Unless this is done, drive requirements can soar to astronomical heights.

As a means of determining that the grounded grid amplifier is at resonance during tune up, the following suggestion is passed on. Since most receivers have "S" meters nearly everyone should be able to set up his equipment in the following manner.

Disconnect the antenna from the receiver and in its place connect a line (either coax or twin-lead) to which a small loop has been attached. The loop should be loosely coupled to the tank circuit of the final. The antenna remains connected to the final.

With the plate voltage to the final *disconnected,* or at least *off,* apply drive to the final stage. First tune the final tank and antenna circuit for optimum reading on the "S" meter. Now, retune the driver stage, adjust taps, capacity or inductance until optimum reading is obtained. Touch up the tuning of the final stage again before going back to tuning up the ne stage.

Obviously if the "S" meter is pinned durin the process, decouple the pickup loop from th final tank slightly. Only comparative reading are important.

Now, remove the pickup link. Apply pla voltage to the final and touch up final tank tu ing. It should be very close to optimum by th time.

To be certain that maximum r.f. is going in the antenna, tuning should be done with a fiel intensity meter such as recently described R-F ammeters in transmission lines only refle the current in the line itself. Unless the line flat, that current does not necessarily have an relationship with the antenna's output.

1. Norman R. McLaughlin, Linear Tips, CQ, March 19

OUR COVER

W4DXJ, Jack Edwards, Greenville, North Carolina achieved this Christmas tree effect by stringing 90 colored light bulbs on his 20 meter beam at five foot intervals using shower curtain hooks to hang them and sliding them up from a gathered position on the ground.

Letters . . . to the editor

RTTY

Gentlemen:

. . . May I take this opportunity to thank you for the new RTTY dept. I am quite sure that this phase of amateur operations will see quite a bit of advancement now that printers are becoming a bit more plentiful.

Frederick R. Heward, K6EER -AAF6EER
San Mateo, Calif.

Pa. Call-Letter Plates

C Q Magazine,
67 West 44th Street,
New York 36, N. Y.

Gentlemen:

Radio Amateurs having a General, Advanced, or Extra First license who reside in Pennsylvania and who own an automobile, may now purchase auto license plates bearing their FCC assigned call letters. This is by Act No. 13 of 1955, approved on May 3, 1955.

There is a gimmick in the Act; the amateur to get 1956 plates, must *write* to the Secretary of Revenue, Harrisbrug, Pa. for a special application blank, fill it in, and return it with a $3.00 fee before January first.

If this is done after January 1, 1956, the amateur will have to wait until 1957 for his plates. . . . Would appreciate if your publication would spread the word and give as many Pennsylvanians as possible the chance to exhibit 1956 call letter plates.

John H. Elder, W3RSB
Attorney at Law
Pittsburgh, Pa.

Dear Sir:

In the October *CQ* Magazine you ran an article entitled "More Life in the Old Super Het". As an owner of a ten year old receiver I found this article not only useful but the best article I have ever seen to pep up an old receiver. This article itself was worth a few years subscription to *CQ* for me as it saved me the price of a new receiver . . .

Bayard Allen, W2ATJ
Mount Holly, N. J.

Experimenter's Column

Editor:

I do believe that the inauguration of an Experimenter's column in *CQ* would be a valuable addition to the Journal. Anyone who experiments likes to tell others of his problems and accomplishments. This would also contribute to the education of those not thoroughly versed in some of these technical fields.

Robert J. Batten
Lincoln Park, Mich.

W2NSD—

Being the type of Ham who would much rather design and build new gear than chew the rag, let me add my name to the list of those who would like to see an experimenters' column, such as you suggested in your October editorial, appear in *CQ*.

Here is a thought I would like to add. I believe that amateur radio should include all phases of radio, not just communication. I wonder if there might be others who would be interested in seeing a spread on radar type distance and speed measuring equipment. Or, does the FCC have rules that restrict such amateur activities? Just a thought.

In any event, I like very much your new expanded form for *CQ*. The occasional guest editorial is a good idea.

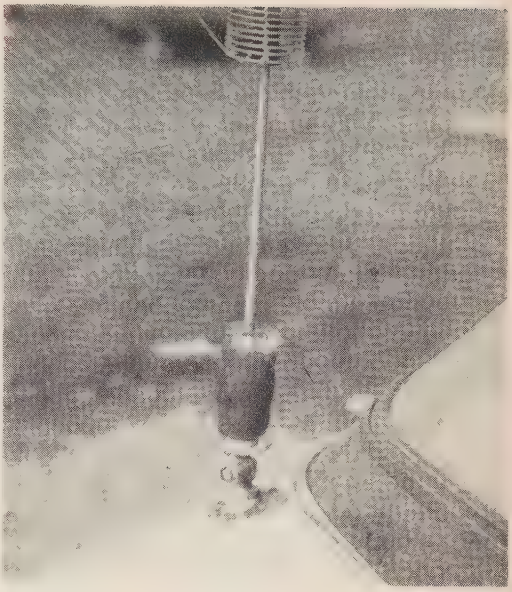
Last but not least, I find the articles on the *Ham and the Law* very interesting.

A. E. Larsh Jr., W6EWB

Dear Wayne:

The September issue was terrific! If the rest of the issues are all like this one, I'm sure glad the man at the Dayton Hamvention talked me into subscribing. Best of Luck.

Don Priebe, W8MQQ
Toledo, Ohio



Dear Jim:

Here's one for the **Hints & Kinks Dept.** This idea comes close to Rex Bassett's suggestion in his antenna article about having the antenna base mounted solid to keep the coil from swaying and changing the Q. With this arrangement I can still tie it down so I can drive in a garage also.

All I did was to take a piece of radiator hose and cut it to length, slip it on, put on two radiator clamps, tighten the clamps and presto it's done in three minutes time. The hose should be a little larger in diameter than the smallest part so it will go around the center.

In motion the coil leans back about 10 degrees and stays there, no sway, no nothing. I use the heavy mount also.

I don't think I ever could be persuaded to mount the whip solid. There are just too many things that could wreck the coil or even tear it out or bend the body.

Ken Judge Glanzer, W0LMB
Vermillion, S. D.
Richmond, Calif.

Wayne:

This is to report an error in the Contest results in the October *CQ*. Under the W2 phone list you have W2DEM, I believe this should have been me . . . K2DEM! Keep up the good work in the "New *CQ*."

Richard, K2DEM
Flushing, N. Y.

Wayne:

Read your editorial and was sorry that I wasn't as alert as I could have been. We almost had an emergency up this way during last week's flood. At 3 p.m. (1500 hrs) on Sunday afternoon 16 Oct, W2UF (Perry Warner), president of the Western Westchester Radio Club, Ossining, N.Y. called to tell us the situation at Croton Dam was quite serious and that our CD zone station was under alert.

With #1 son "Jerry" in tow, we heaved the emergency generator into the trunk along with a big searchlight. Binoculars on the front seat, log book and license beside them, and with the Argus C3 complete with flash attachment sitting uselessly on a shelf in the den, we took off with the mobile for Croton, seven miles away.

The radio circuit was already set up with W2UF at his home station and K2CQG and K2DHX at the CD station both in Ossining.

We checked in en route and found that W2VKT was at the east shore road block while W2PSH (with XYL) was at the West shore road block. Both mobile.

If the dam let go, we were to give the alarm.

We checked in at the road block to W2VKT (Larry France) who gave us all the dope on the situation so out of curiosity we thought the most interesting spot to be would be on the dam itself (about a quarter mile down the road from the road block).

We parked the mobile on the East end of the dam and started looking things over with the binocs.

Reported to W2PSH on some sightseers walking around on his side of the spillway down under the dam. They were promptly chased.

[Continued on page 97]

DX

Gathered and reported by

R.C. "Dick" Spenceley, KV4AA

Box 403, St. Thomas, Virgin Islands, USA

We welcome the following as newcomers to the HONOR ROLL:

W7ADS	**37-177**
W8KML	**36-191**
W8KML	**36-190 (Phone only)**
W0QBA	**36-141**
W8JGU	**35-173**
LU5AQ	**35-158**

As is our custom, as the year draws to a close, we salute the efforts of the following DX stations and Expeditions whose activities during 1955 have done much to make DX'ing a very interesting pastime this year and have been instrumental in giving many of us a "new one":

Afghanistan-YA1AM
Ascension Island-ZD8AA
Brunei-VS5CT, VS5KU
Cayman Islands-VP5BP (VE3CJ)
Cocos Island-TI9MHB (W6MHB)
Corn Island-YN0YN (W0AIW,-W0EIB, W0MAF, YN4CB)
Ethiopia-ET3S, ET3LF
Gambia-ZD3A, ZD3BFC
Guiana (Fr.)-FY7YE, FY7YC, FY7YF
Jan Mayen Is.-LB1LF
Johnson Island-KJ6BG
Leeward Is.-FP8AK/VP2 (W2BBK), W60XS/VP2 (W6OXS, W6VUP)
Andorra-PX1EX/P (F8EX,-F8EO, F31B, F9UK)
Basutoland-ZS8L (ZS1PD)
Caroline Is. (Western)-KC6CG
Chagos Islands-VQ8CB
Cocos-Keeling Is.-ZC2PJ
Egypt-SU1IC
Formosa-BV1US
Gilbert and Ellice-VR1RO (G2RO)
Hungary-HA5KBA
Laos-XW8AB
Kerguelen Island-FB8XX
Liechtenstein-HB1MX/HE, HB1OP/HE, HB1KU/HE
Madagascar-FB8BR
Mauritius-VQ8AY (G2RO), VQ8AG
Nauru Island-VL0RO (G2RO)
North Borneo (Br.)-ZC5CT
Nyasaland-ZD6BX
Pitcairn Island-VR6AC
San Andres Is.-HK0AI
Sarawak-VS4CT, VS4NW (ST2NW)
Togoland (Fr.)-FD4BD
Turks and Caicos-VP5AE, VP5DC, VP5BM
Marion Island-ZS2MI
Monaco-3A2BH (HB9KB)
New Guinea (Dutch)-JZ0AG, JZ0DN
New Hebrides-YJ1DL
Qatar-MP4QAL
Río de Oro-EA9DF
San Marino-I1DCO/M1
St. Martin Is.-PJ2MA, (PJ2AA)
Trucial Oman-MP4JO,-MP4QAL
Wallis Island-FW8AB

We think you will agree that this is a rather imposing list. . . . Now let's see what 1956 will bring . . .

At Time of Writing

3A2BH opened up about October 8th. This is a two week expedition by Swiss hams. From the activity heard contacts should total in the thousands. QSL's should go via the USKA Bureau. . . **HB1KU/HE** also showed from Liechtenstein and dispensed many contacts. . . **YA1AM** seems to be OK in Kabul, altho undercover. His QSL, received by W1FH an W6GAL/7, requests that cards go via ARRL

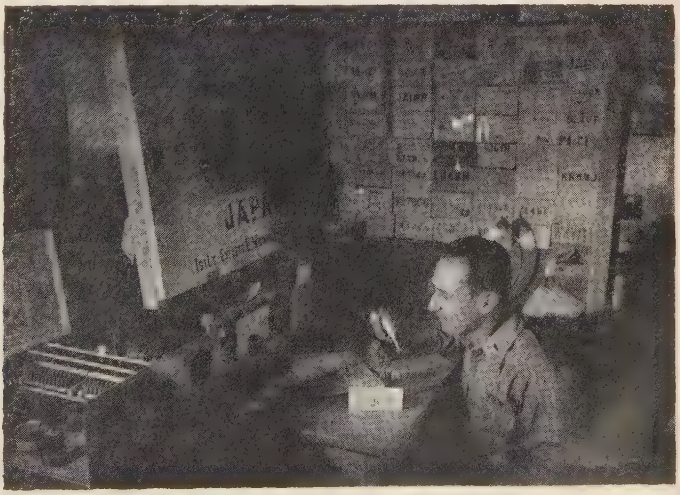
At a recent get-together in Yugoslavia are (standing l to r) Mirko, YU1AD, Bob YU1GM an a YU-SWL. (Front row l to r) Marv, SV0WM and YU1KQ. YU1GM, who is a W4, has now left YU-land and may be contacted via W4FBH.

Our congratulations to the following two stations upon their entry to the WAZ ranks:

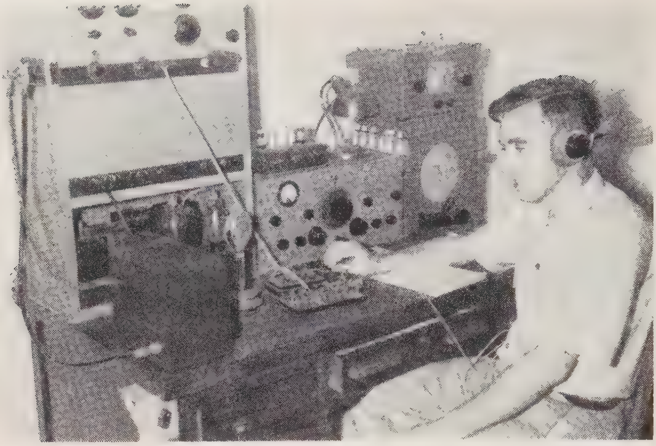
No. 311 LEROY A. BATES
W7HXG 40-220
No. 312 C. G. "BERT" ALLEN
G8IG 40-193 (PHONE)

W7HXG is the seventeenth W7 to acquire this coveted award while G8IG is to be especially commended in winning the second ALL PHONE WAZ. As in the No. 1 PHONE WAZ, held by VQ4ERR, an overdue pasteboard from UA0KFD did the trick for G8IG.

. . . **BV1US** has obtained an xtl for 14 Mcs. CW and has been appearing on 14052 around 1230 GMT daily. . . . **ZC5CT**, Pete, set up shop in British North Borneo about September 20th and was heard frequently on 14075 around 1300 GMT. . . . Via W0IEV and the West Gulf Bulletin we learn that the license of **HK0AI** has been cancelled by order of the Governor of the island. . . . VU2AX was heard in contact with **AC5PN** and we are advised that AC5PN will appear on 14100 each weekend. For further word on AC5PN we quote, in part, a letter to JA1CR: "As you know I am a newcomer to the bands and the first amateur in Bhutan. I am starting with a portable B2 transmitter of 20 watts output to a dipole antenna. I hope to be on with much more power within three months. My station is located at Thimphn, the Summer capital of Bhutan, which is located in the central part of this country. There are no post-offices or other communications except caravans and mules. We receive our mail from Bhutan House in Kalimpong, India, and it takes 18 days, or more, to reach here. . . " In spite of the various ZA calls heard we understand that no Albanian ham licenses have been issued. There is a definite radio movement underway there, however, and we hope it meets with success. . . . Mario, **FY7YE**, is usually on from 1030 to 1130 GMT, 060 to 080, on 14 Mcs. . . . YA1AM was contacted by W4CEN at 0100 GMT, 14080. W1FH's QSO was at 1620 GMT near 090. YA1AM is VFO. . . . **XZ2OM** has been active around 1300-1400 GMT near 14098. . . . MP4QAL, now in Bahrein, has been heard signing **"MP4QAL/B"**. . . . F9AH hooked **HV3UBW** and got the following QTH: "Nick Karim, 1932 AACS Sqdn APO 677, PM, NY" . . . We are advised unofficially by Ted, SV0WL, that licenses will be granted to SV1 hams on October 15th and there will be about ten of them on the air. . . . Via W4IMI we hear that Jack, W3YHI, operator at KA0IJ (Iwo Jima), is hospitalized in Japan following an injury while erecting antenna poles on Iwo Jima. He should be back at KA0IJ by now. Jack says the 170 MPH typhoon of September 25th may have swept the KA0IJ trailer into the sea. Other hams were due in KA0-land from August. . . . DX'peditioners might well consider a trip to Aves Island in the Carribbean. This spot is a Venezuelan possession located about 100 miles west of Dominica. Brad, KP4TF, who recently flew over the spot, says it is a sandy, flat island about one mile long and 200 yards wide and shaped like a two/third moon. There is a coral reef surrounding it and landings should be easy in normal weather. Permission, of course, must be obtained from the Venezuelan government (This is a "natural" for a YV0 call). . . . JA1CR reports that a school station, **HL2AA,** was licensed in Seoul with permission to operate on 1.8, 7, 14, 21, 28 and 144 Mcs. . . . **VK1RA**, Mawson Base Australian Antarctica, is on daily at 0630, 095. Name is Bob. . . . Via the West Gulf Bulletin we hear that a PK4 was to have operated from CR10-land in late October. Phone with 14110 xtal. . . . ZC5VR is now **VS2EW**. . . . As a reminder we repeat that Jock, ZL2GX and Alan, ZL1PA, plan a trip to the Kermadec Islands around mid-January if a suitable boat



Everett, KA2CY, runs 1 KW to PP 100TH's modulated by 100TH's. QTH is Niigata, Japan.



Eduardo, LU 3 DAB, of San Isidro,
Argentina runs 807's at 100 watt
to a ground plane antenna on
7, 14, 21 and 28 Mcs. He is on da
and sports a country total of 111.

for the 1400 mile trip can be obtained. . . . Via W6AM we hear that W6LJQ is a civilian (GE) engineer with the 6th fleet in the Mediterranean who expects to get on from such spots as Rhodes and Crete. . . . Via commercial circuit W2AH learned that **ZD8AA** should be back on from the end of October. . . . CR8AB arrived back in Portugal on October 3rd and is now CT1CP. This news comes from his pop, CT1CB. . . . Yves, **PX1YR**, reiterates that the recent PX1AA is a pirate and that he is the only legal ham in Andorra (via letter to W8CFX). . . . W2DPM/3, ex-F7BA, will be in Thule about December 1st dishing out KG1 contacts. . . . **MP4JO** now definitely states that he is in Oman and runs 95 watts to a 3 element beam. QSL via W2PCI. . . .

YASME-VP2VB/P

Danny sailed from Balboa at noon October 9th bound for the Marquesas. He was immediately be-set with gale winds, high seas and overcast weather. This weather continued for a solid week in which he was blown off course to the southeast. Fear of hitting Mapelo Island in the darkness caused him many sleepless hours. Bearings from Colon were obtained but an exact "fix" could not be obtained. Finally the sun broke through on October 17th, enabling him to take sights which placed him at 80 degrees 57 minutes west and four degrees 8 minutes north or about 30 miles from Mapelo Island. His spirits soared on the 18th when the wind shifted around and began bowling him along in the right direction. Much time was spent sewing up his sails which were badly mauled by the gale. Other diversions were occasionally shooting one of his shark escorts and watching his fellow travelers tear him to bits. VP2VB/P puts an S8 signal into KV4AA and schedules are maintained on 14080 at 1300, 1630, 2000 and 2300 GMT. These may be altered, as Danny gets farther away, to suit conditions. If all goes well the Marquesas should be reached sometime in December.

DX'ploits

Chas, W1FH, strengthens his top-place spot
adding YA1AM plus a 1950 QSO wi
ZL1ABZ in the Kermadec Islands for an i
posing 264 total. . . . Al, W8PQQ, wi
YA1AM upped to 254 while Ed, W6DZZ, re
on 249 thanks to FW8AB, VR6AC, PX1E
and FD4BD. . . . Dewey, W6VE, goes to 2
with FD4BD as Gene, W6EBG, comes up
date with 11 new ones which include VS4C
VS5CT, PX1EX, FG7XB, FW8AB a
FD4BD for 239. . . . Lee, W7HXG, subm
new list for 220 total along with QSL's f
WAZ No. 311 while Bert, G8IG, nabb
XW8AB for No. 219 CW and VP5BP, KC6C
for 193 on phone. . . . Clay, W6LGD, h
179 with XW8AB as Geb, W6AOD, goes
146 with SP3AK, OD5LX, YV5EZ, VP9C
and YN1AA. . . . Among the 39-zoners Bi
W5ASG, embellishes his top position wi
FB8XX for 252 and going to 188 on pho
with FB8BC and VQ8AL. . . . Glenn, W8KI
ups to 249 with YA1AM and 3A2BH as
W2WZ, has a 244 total with XW8AB a
YJ1DL. . . . Stan, W1CLX, nabbed ZC5C
and FD4BD for 242 as John, W1BIH, com
up to date with fourteen additions which
clude 3A2BH, ZS8L, XW8AB, PX1E
KJ6FAA and KC6CG for 236. . . . V
W9HUZ, hooked ZS2MI, XZ2OM, FB8

Honor Roll Endorsements

(To October 15th 1955)

CW/PHONE		W9HUZ	39-230	W7ADS	37-
W1FH	40-264	4X4RE	39-227	W8KML	36-
W8PQQ	40-254	W1JYH	39-224	W5FXN	36-
W6DZZ	40-249	W8UAS	39-222	W0ANF	36-
W6VE	40-241	W3KDP	39-215	W0QBA	36-
W6EBG	40-239	W2GVZ	39-195	W8YIN	35-
W7HXG	40-220	W0QVZ	39-173	W8JGU	35-
G8IG	40-219	F9AH	39-170	LU5AQ	35-
W6LGD	40-179	W2HMJ	38-214		
W6AOD	40-146	GM3EST	38-203	PHONE ONL	
W5ASG	39-252	W3AXT	38-178	VQ4ERR	40-
W8KIA	39-249	W9LI	38-173	G8IG	40-
W2WZ	39-244	W9FNR	38-162	W6KQY	38-
W1CLX	39-242	JA1CR	38-137	W8KML	36-
W1BIH	39-236	OZ7BG	37-186	W0NCG	36-

Last complete HONOR ROLL appeared in the September is
Next complete HONOR ROLL will appear in the January is

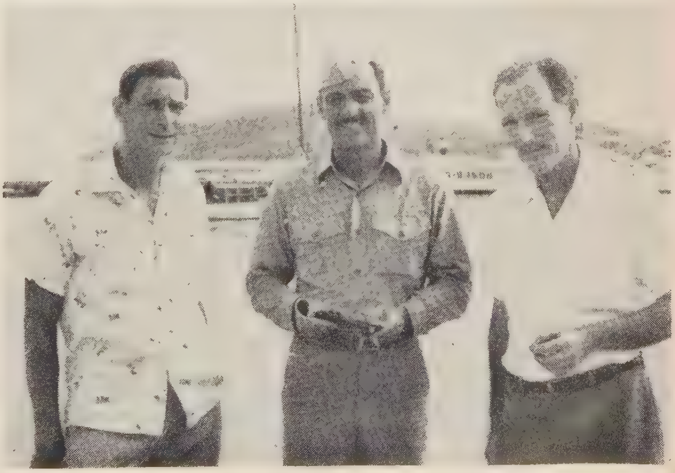
Yugoslav Certificate
WAYUR

(Worked all Yugoslavian Republics)

1. **WAYUR** is issued by the **SAVEZ RADIOAMATERA JUGOSLAVIJE (SRJ), Trg Republike 3/IV, Belgrade.**
2. **WAYUR** is obtainable for any licensed ham.
3. **WAYUR** is based on the fact that Yugoslavia consists of six Federal National Republics, as follow:
   - **YU1**—Republic of **Serbia**
   - **YU2**—Republic of **Croatia**
   - **YU3**—Republic of **Slovenia**
   - **YU4**—Republic of **Bosnia and Herzegovina**
   - **YU5**—Republic of **Macedonia**
   - **YU6**—Republic of **Montenegro**
4. QSL cards must be submitted (by non-European stations) confirming contact with two stations in each republic on **TWO** different bands. 12 QSL's (for European stations, three contacts in each republic on at least two bands).
5. Contacts must be made **AFTER February 1st, 1956** and **10 IRC coupons** must accompany the QSL's.
6. **WAYUR** is issued for **CW only,** or **phone only.** No mixing.

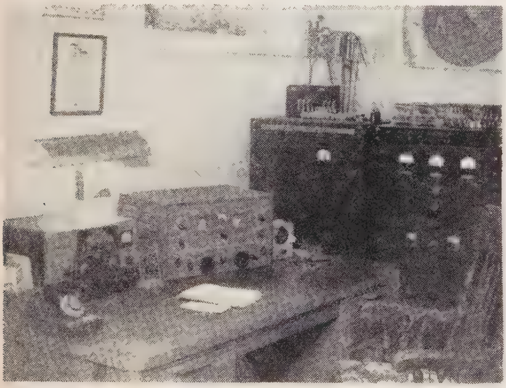
(Thanks Mirko, YU1AD)

and FD4BD giving him 230 as Egon, 4X4RE, adds LB1IE (Jan Mayen), VK9OK and VP2GW for a 227 total. . . . Roger, W1JYH, ups to 224 with PX1EX, FB8BR and VQ6LQ as Joe, W8UAS, rests on 222 thanks to 3A2BH, ZM6AT and FB8XX. . . . W3KDP nipped FD4BD for No. 215 as Pat, W2GVZ, goes to 195 with ZS8L. . . . Bob, W0QVZ, pulled in ZC4CK, LB1LF, 3V8AN and VU2MA for 173 while Roger, F9AH, hooked his 39th zone with XE1MJ and went on to add XW8AB and KC6CG for a 170 total. . . . Gus, W2HMJ, hit 213 with FD4BD as Andy, GM3EST, added MP4QAL and ZD6BX for 203. . . . Sam, W3AXT, stepped to 178 with 3A2BH while Jim, W9LI, adds 4X4CK, ZD6BX, FD4BD, FB8BR, HB1KU/HE, ZS8L, VQ6LQ and XW8AB to reach 173. . . . Smitty, W9FNR, adds two zones with ZD2DCP, FB8BR, ZS8L, PX1EX, VQ6LQ and XW8AB and a 162 total while Takeo, JA1CR, goes to 137 with ZS8L, VP9BM, AC5PN, ET3AH, VP8AI, FF8AJ, HR1RL, KP4AZ, YV1AI and XW8AB. . . . Eric, OZ7BG, hits 186 with HH2FL, XW8AB and ZD3BFC as Jim, W5FXN, got a new zone in FB8BR and went on to add ZD6RM, HB1KU/HE, YJ1DL and VU2JG. . . . Harry, W0ANF, upped to 173 with VQ6LQ, PX1EX, VR3B, MP4QAL and FD4BD while Mickey, W8YIN, adds KC6CG and VS1CZ for 189. . . . Robbie, VQ4ERR, goes to 299 on A3 with VS5CT, FO8AD, PX1YR, VK1EG, VP8AI and VP1GG while Ernie, W6KQY augmented his phone total with JA0AG, AP2U and VO6J for 190. . . . Ray, W0NCG, added a new zone and country with FB8BC for No. 168. . . . New stuff with Tom, K2GMF, includes HB1KU/HE, HK4EG and CT2BO. . . . Alan, VK3CX, added PX1EX and FY7YE to reach 195 while Lloyd, W0QGI, goes to a 30 watt of 120 with PX1EX, UA0KKB, JZ0AG, VS6CO, KJ6FAB, VR3A and VK9AU. . . . Gary, W6NJU, hits 84 with OQ5BT, CR6CZ, 9S4AX, VK1EM, VR6AC, ZS7D and VK9WP. . . . A month's DX effort at W8URO has resulted in 29 countries for Roger on 7 and 14 Mcs. . . . Latest contacts for Lloyd, DL4ZC, include KR6QO, FK8AB, VQ8AG and KL7ADQ on 14, ET3AH, KZ5VP and many VK's, ZL's, W6's and W7's on 21 CW. . . . Latest for Doug, W9FDX, have been XZ2OM, FD4BD, VS1GX, LU9ZI and VP8BD while Paul, W9GFL, using 21 Mc. phone has come up with such as KA2GS, KR6AB, VQ2RH, VP8AQ (So. Shetlands),



Left to right, Danny Weil, VP2VB, Paramount star Bill Holden and Dick Spenceley, KV4AA in St. Thomas, V.I. The YASME may be seen in the background between Bill and Danny.

VP1SD, HH2W, KL7AOS and OE1PC. CW on the same band accounted for OH2NI, LZ1KPR, ZB1AY, OE3VP and F8WK. . . . VE3IG's entry into DXCC resulted in quite a spread in the Niagara Falls Evening Review (Sept. 28th). . . . VK5BY, VK4YP and CE3DZ are new members of the FCOC (First Class Operators Club). . . . Paul, W2GFQ, goes to 165 with KC6CG, KX6NA, KJ6FAB, VQ8AG and SV0WT. . . . VK3CX completed a YL-WAC by contacting Soma, 4S7YL. . . . Frank, W8KAK, grabbed YN4CB for his No. 100 and went on to add FB8BR, FF8BF. VS1GX, FM7WF, 3V8AN, ZD3A, FQ8AX and F9YP/FC while Guy, W6EFV added XZ2OM, XW8AB and ET3LF. . . . W9WKU rises to 134 with XW8AB, ZD2FNB, VS6CW and VS1CZ while George, W3AS, hooked FB8BR, ZA2G and FD4BD, all in 90 minutes, to reach 142. . . . W6VX nabbed ZC2CC on 7 megs. . . . G3FXB ups to 195 with KC6CG and ZC5CT while 3A2BH was responsible for VK3CX moving to 194. . . . 5A2CL was No. 109 for Don, W3RTB as Ted, W4GXB, went to 200 with YI2AM. . . . After a five year try W8MJW finally came up with VQ8CB! . . . Dick, W6TKX, reached 100 on 7 Mcs. and reports such as FI8AC, HL2AC and CE2ZJ on this band. . . .



Operating position of W6RCC. Owner Bill Cryer, Oakland, Calif., first licensed in 1934, packs a potent signal. (Photo Courtesy North Calif. DX'er)

Here and There

Thor Heyerdahl of "Kon Tiki" fame is now in Panama on his way to Easter Island where he will spend a year of archaelogical research. We have been advised that no hams are with this expedition. . . . DL4PGF was worked. Joe is ex-DL4TD and W5PGT. . . . Keith, VS6CO, does a nice job with 25 watts and a Quad. VS6CO is a club station of the RAF. . . . W3DWR informs us that CR6AI is looking for W contacts on 3510 kc. . . . Doc, W4VE, ex-KA9AA/KR6AA, is now the C.O. at the Army and Navy Hospital at Hot Springs, Ark. He may be heard using his old call W5MY. . . . Nick, VU2JP, was due to sail for India

LAST MINUTE ITEMS

VS4BA has been showing on 14047 starting up about 1215 GMT. . . . **YA1AM** appears on 14072, 1400 to 1700 GMT (some days). . . . **XW8AB** may usually be found on 14067 coming on about 1245 GMT. . . . VQ8CB informs us that a VQ4 was due to go VQ9-land. Leny goes on to say that the VQ4 is expecting help in this endeavor from VQ9'ers and it is doubtful if he will get any. . . . LU5AQ tells us that there is an active **LU/Z** station on the **South Sandwich Islands** who will be active up to a couple of weeks in January. Info as to his call is expected momentarily. This should be a real nice catch for, as far as we know, there has been no ham activity on this group before and it rates as a separate country. . . . From LZ1KAB we learn that **SP3AN** and **SP5FM** plan a **DX'pedition to Albania**. Many difficulties, official and otherwise, must be overcome before this trek becomes a reality. . . . The LZ bureau is being flooded with QSL's for ZA contacts. They wish it known that addresses for any ZA stations (pirates or otherwise) are unknown to them. . . . Via OH1SS another trip to **Aaland Island, OH0**, will take place in March or April. . . . XZ2OM advises that the Burma QSL bureau is temporarily out of business and any QSL's for contacts should go directly to the address of the station contacted. . . . Best wishes to **OY7ML** on his recent marriage. This will curtail his ham activities a bit for the present. . . . An, **PZ1BS**, is quite active near 14015, 1100 to 1200 GMT these mornings. . . . **ZS1PD**, who recently spent some time operating from **ZS8L**, in Basutoland, may now be reached at the following address: H. de Wet, "Kartoum", P.O. Gadzema, Southern Rhodesia (West Gulf Bulletin, W5DMR). . . . Via W7SGN we hear that Gino, **I1DCO**, may have staged a return bout in San Marino and, if so, should have been heard during the last of October. . . . Conflicting reports as to **MP4JO**'s QTH force a QRX attitude upon us until he returns stateside. . . . Via West Gulf DX Bulletin we get the following particulars on **ZS2MI**, Marion Island: He operates mostly on phone but goes to CW at times. He has no fixed frequency for CW but on phone he sticks near 14168. He is on every day from 1230 to 1500 GMT. Two or three times a week he also gets on from 1700 to 1800 GMT. Barrie uses a rhombic antenna beamed on Capetown, the one used for official traffic, and is not permitted to erect any other antennas (The rhombic is OK, terrific reports in W-land). . . . **MP4BBW** has just fired up from Awali with a Harvey-Wells and 75-A-2. . . .

on October 25th. . . . Two QSL bureaus have been initiated to facilitate the handling and expense of sending QSL's to foreign countries. Full information may be obtained from the following addresses: United States of America DX QSL Co-op, Box 5938, Westport Station, Kansas City, Mo. (W0DVN). Or, Russell E. Burss, W9RKP, 3540 S. 5th St., Milwaukee 7, Wis. Both of these bureaus operate independently of each other. . . . A report from SU1IC states that there are only two licensed hams in Egypt. SU1IC was licensed in February '55 and runs an 807 to a dipole. He stands at 78 countries and 35 states. The other ham is SU1AS who runs 100 watts and is usually on phone. . . . Ernie, W6KQY, and xyl, W6LNP, are back home after an auto tour of Europe in which visits were made to DL4XK and PA0JA and many other DX buddies. Ernie thinks we should restate that the phone HONOR ROLL requires TWO WAY phone contacts and not the phone/CW variety. . . . Andy, GM3EST, is on again after a trip to VP3, VP4 and VE-lands. He seeks QSL from AC3SQ for No. 200 . . .

Fresno DX Meeting

The annual meeting of the Northern and Southern California DX Clubs will be held in Fresno on the 14th and 15th of January 1956 at the excellent Hacienda Motel on the West side of Highway 99 about three miles North of the city. The registration fee, banquet and breakfast, including tax and tip, is $7.50 per person. Further details on the program and arrangements may be had by contacting the Fresno Arrangements Committee, c/o R. W. Johnson, W6MUR, 1202 Avoca Ave., Pasadena, Calif. . . .

L to R is Feri, HA5BW, and Lloyd, DL4ZC, taken during a ten day visit of the latter to Budapest recently. Lloyd also visited HA5KBA during the WAE DX Contest where most of the ops were 30 WPM SWL's. Lloyd was the first American seen by most HA hams since the war.

From XW8AB to W9EU

Vientiane, Laos 9-9-55.

Dear OM Alex:

I received this day your letter and card. Best thanks. I will try to answer you correctly, but my English is poor. I learned English at school (5 years), but no practice enough.

I am in Laos since 16 months, but could not have my call before. I am in Chief Radio by Haute Representation Francasie (this is the old Haut Commissariat) and will soon be the Ambassy.

Your friend Senator Dirksen has good observed. Laos is really one of the most primitive and poorest country I have ever been. People knowing that I am in the Capitol of Laos can imagine that I am in a great and nice city. But they can never imagine that this capitol is nearly the same as a small locality in the jungle (am not sure if this last word is also good in English hi!) The difficulties here are great for everything.

My home in France is Colmar in Alsace. I was from 1945 to 1954 in French occupation zone in Germany (DL5BS). So my XYL is German hi! I had some good American friends there.

I am always very glad to QSO W stations, but what a grin; on the air and here with all the QSL's.

From time to time I go to the USIS (United States Information Service) which has a pretty room in Vientiane with many pictures and magazines. So I can see photos from the different cities and countries of the States I have worked. hi! Amateur radio is very good to learn geography.

I put pretty stamps on your envelope. If you are not stamp collectioneer you have sure a friend who will be interested. If indeed you have a friend who is collectioneer I would be glad to swap stamps from Laos for U.S. Stamps. But not actual stamps from U.S.A.

In a few weeks I will receive from XYL other QSL cards (pretty), printed in Germany and will send you a new one. The printer in Vientiane is as primitive as his whole country hi!

So, dear OM Alex, I thank you very much for all, hope meet you again on the air and hear from you soon.

Best 73's from Laos, XW8AB, Marcel Zinck.

Addresses

AC3SQ ....S.Saja, Gangtok, Sikkim.
AC5PN ....Chhawna, c/o Bhutan House, Kalimpong, India.
AP2PB ....Haripur, NWFP, Pakistan.
AP2Q ....203 Mall Road, Rawalpindi, Pakistan.
ET3AH ....Box 499, Addis Ababa, Ethiopia.
HC4MK ....Martin Kohls, Box 2327, Quito, Ecuador.

[*Continued on page 111*]

VHF

Reported by Sam Harris, W1FZJ
P.O. Box 2502, Medfield, Mass.

Time was when a gathering of VHF men was sure to produce at least one heated argument anent the relative merits of vertical and horizontal polarization. Now-a-days the same gathering produces another (though usually just as heated) discussion (that's a discussion?) concerning the advantages and disadvantages of using parasitic arrays instead of colinear arrays. As an unbiased participant in many of these learned jam sessions, I feel that a few definitions should be set forth. This to dispell the aura of ignorance which oft' besets the unenlightened ham. Particularly those poor benighted fellows who insist on performing impossible feats with equipment that you just can't do that with.

Any additions to, or corrections of the following list will be gratefully accepted.

Yagi antenna. Any antenna having a driven element and two or more parasitic elements. This is not to be confused with a *parasitic* beam which is any antenna having three or more elements, one of which is driven. A *True Yagi* is generally defined as a parasitic beam with two extra reflectors. Everyone recognizes a *true* Yagi and any discussion of antennas can be called to order and sometimes terminated by its mere mention. A *phased array* consists of two or more half-waves fed in phase; such half-wave having a parasitic reflector. The addition of parasitic directors to a phased array is generally conceded to increase the weight of the beam. A *Colinear array* is a phased array with connections. This type of antenna is generally rotatable and the addition of parasitic elements not only increases its weight but also is reputed to increase the standing wave ratio.

With the above set of clear and concise definitions as a discussional framework, all that remains is a set of operational questions to guide the conversation along the prescribed channels.

← **Ninety-six element beam, western style. Ernie; W7LHL, installation with W7JIP at the forty-foot level.**

To Wit:

The following statements are to be answered True or False. Score plus 10 for each true answer. Minus 10 for each false answer.

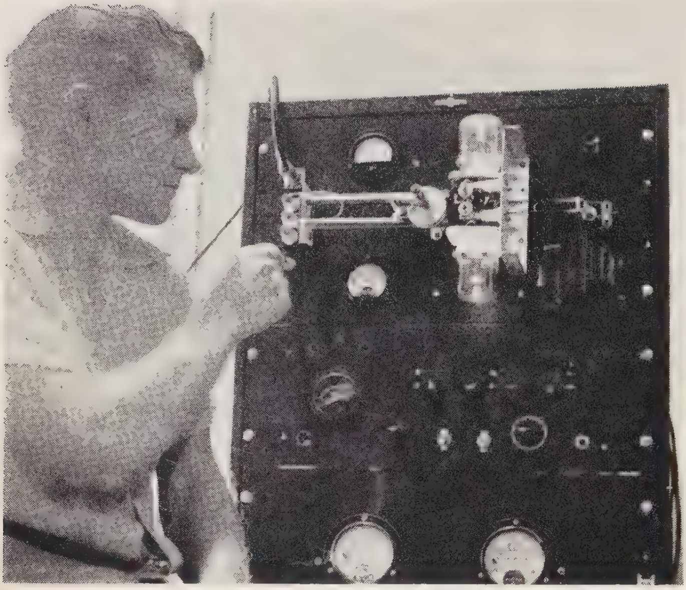
1. A Yagi has a higher front to back ratio.
2. A phased array is larger for the same amount of gain.
3. A colinear array becomes a parasitic array if more than two parasitic directors are added.
4. A Long John is a True Yagi without side reflectors.
5. W6QKI claims 16.8 DB gain for his new fifteen element Yagi.
6. VE3DIR has worked twenty-two states since July (present total 26).
7. A thirty-two element colinear array is superior to a sixty-four element phased array.
8. W4HHK has worked twenty-nine states with a thirty-two element phased array.
9. Only parasitic antennae work on six meters due to sporadic E.
10. The incoming signal can have a negative approach angle when scattered from the ionosphere.

A score of 80 or more in the above test makes you ripe for a good argument.

Openings

Word from Tony (VE3DIR) tells of a good opening extending southwest from Western New York to the state of Mississippi and all its environs such as Alabama, Tennessee, Arkansas, Missouri, Nebraska, Kentucky and Indiana. Tony worked six stations, four of whom were new states. Brings his total to twenty-six. While we have had no word from him we hear that Shelby (W4WNH) finally worked out of his hole during this opening.

Another opening along the eastern seaboard produced W4CPZ in South Carolina for those state hungry characters who were sufficiently recovered from the contest to be on the air. This opening managed to get W4CPZ as far west as Ohio and as far north as Connecticut. (I knew I shouldn't have gone to bed that night.)



Al Hayes, W5JQU, with his two-meter 826 final.

Activity

Wintertime is fast approaching. With it comes a waning of activity for the VHF bands. Partly due to a decrease in the number of openings and partly due to the much improved propagation conditions on the lower frequencies. For the dyed-in-the-wool VHF man this period of lower activity and poorer propagation conditions, generally ushered in by the first fall of snow, marks the beginning of a most enjoyable season. Now begins the struggle to keep open the communication paths which were established during the lush fall months. Now the equipment gets its first real test. Receivers are polished, antennas are pruned, transmitters are over-hauled and the earphones and keys are taken out of the mothballs. The backbone of this type of activity is the schedule. It doesn
matter if the schedule path is long or short i
terms of what others are doing or have don
What counts is the proving in of equipment ove
a regular path. It is desirable to try to arrang
schedules with someone situated at a distanc
or in a direction that is just beyond your re
liable range. In this way improvements in you
equipment will show up in terms of more suc
cessful contacts per month. Multiple hop schec
ules are sometimes helpful in maintaining cor
tact over otherwise impossible paths or di
tances.

The operating position complete with W2ORI, John.

With two-meter activity at its present level,
is quite possible to send messages from th
east coast to Chicago any night of the year. Th
message might quite possibly be sent on t
Texas by the Chicago boys and from there the
could conceivably get to Florida. A messag
from Maine can travel down the east coast a
far as North Carolina. Possibly some effort o
the part of the Virginia, North Carolina, Sout
Carolina, Georgia and Florida boys could ex
tend this path to cover Maine to Florida. Th
only way such a path can be covered is by th
process of building up a chain of schedules i
the desired direction. (Anybody along that pat
got any suggestions?) From where we sit in Ne
England two meter activity to the west forms
continuous chain across New York state t
Toronto, down Lake Erie to Ohio, up to Mich
gan and over Lake Michigan to Chicago. Ac
tivity to the south gets as far as the Southe
New Jersey area and stops dead. Virginia an
North Carolina are there when the band is ope
but seem to disappear into the great unknow
when conditions get poor.

We are in the process of preparing a set
hand embroidered "Certificates of Merit" f
every station participating in the first successf

relay of a message from Maine to Florida. The boys in Maine are ready, how about the rest of you?

Contests

As we are presently formulating plans for the Spring CQ VHF contest, it seems an appropriate time to call once again for suggestions. After canvassing every suggestion to date we see no way in which a contest which will equalize scores from Maine to California can be held. Never-the-less we are open to suggestion. Any comments as to scoring, sections, multipliers, etc., will be appreciated. Present thinking places the contest sometime in April. Contest is open for all bands from six-meters on up with awards for each band in each section. A special multiplier for operation above the first megacycle in each band has been proposed. How about some comments on a power multiplier?

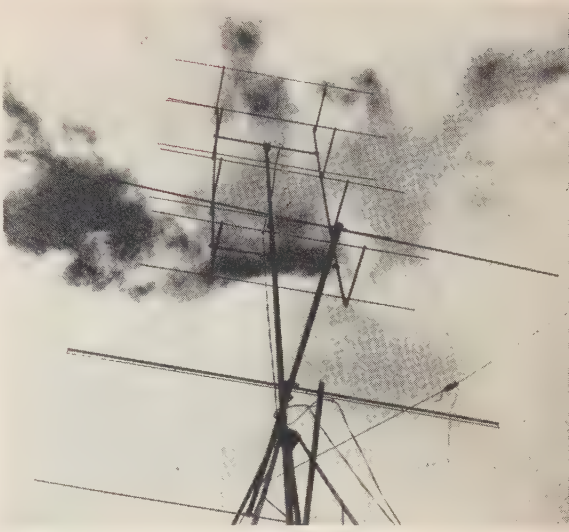
Six Meters

By the time you read this column the slowly grinding wheels of progress will have ground out a ticket for the XYL and you will be quite likely to hear her on six. The six-meter antenna (ready since last July) will be up and the cobwebs cleaned from the transmitter. Helen (W1000) will be open for schedules in case anyone needs Massachusetts on six. This also will make possible the keeping of morning skeds on two-meters. (An impossible task for yours truly.) It sure will be a pleasure to get the dope from you six-meter boys the easy way. Be on the lookout for a sweet voice.

S.S.W. CONTEST

Scores for September

Station	States	Contacts	Final Score
W1AQE	10	432	15,984
WN1DDN			942
W2NSD/1-N.H.	3	42	924
W1PYM	6	12	336
W2WFB	12	562	21,356
K2APS	15	230	9,430
KN2KET	7	118	3,540
WN3DEX	12	314	11,930
WN3BJG	7	290	8,700
W3TDF	15	120	1,800
W4WNH	7	84	588
K6KCI	1	590	5,900
W6LBO	1	396	3,960
W7QDJ	1	110	1,400
W8LAH	9	546	18,564
W8LOF	11	254	9,398
W9KLR	12	148	12,748
W9KLD	7	292	8,760
W0RSP	6	93	2,604
VE3DIR	11	390	15,990



The two-meter and six-meter antennas in use at VE3AIB.

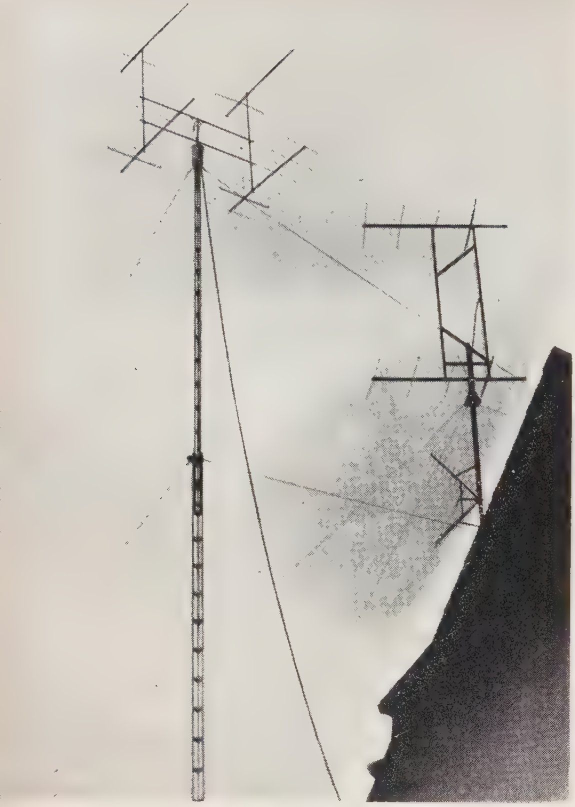
Letters

Ayer, Massachusetts WN1GYU, George, sends us a bit of interesting news, and we're looking forward to the results of the endeavors to be made.

> "Just thought you might be interested in the Fort Devens idea about getting on the two-meter band—via the airplane. At the present we have several de Havilland L-20 Beavers equipped with two-meter gear, that are doing fine business for Jack (W1ZTE), Nelson (W8FFO/1) and George (WN1GYU). We are using Aircraft Radio Corp T-13 transmitters with a 5763 in final loading a 22" vertical whip antenna with two watts. The receiver is an ARC-12. Our best DX was made by George at ten thousand feet for an air-ground distance of two hundred and eighty-three miles.
>
> "Around the 21st of October Nelson and George will fly south via the eastern and gulf seaboard to participate in EXERCISE "Sagebrush", being held in Louisiana. Upon completion of this field exercise, around the 15th of December, we will fly back the same route. Since we will be flying convoy control—our progress will be slow—so we hope to work many 'hams' on our jaunt.
>
> "Sort of hope you'll publish this so that friends along the way will monitor 146.825 Mcs. Anyone interested in our proposed itinerary can write WN1GYU, 9 Myrick St., Ayer, Massachusetts." *We are publishing it, George, and hope you get lots of contacts because of the publicity. Let us know, HUH?*

Akron, Ohio Art, W8KAY, (*one of our sked contacts*) supplies us with the following information:

> "Now have three, ten element yagis stacked vertically with 5/4 wave spacing—75′, which



The signal squirters at W2ORI.

Skeds:

VE3DIR 144.2 to W1FZJ 144.25
2200 EST
W9WOK 144.126 to W1FZJ 144.25
2215 EST
W8KAY 144.301 to W1FZJ 144.25
2230 EST
W8KAY 144.301 to W1REZ 144.25
2230 EST
W8KAY 144.301 to W1RJA 144.25
2230 EST
W2ORI 144.020 to W9WOK 144.126
2225 EST
W2ORI 144.020 to W1FZJ 144.25
2245 EST W1REZ 144.25
2245 EST W1RJA 144.25
2245 EST
W9EQC 220.128 to W8SVI 220.100
2215 CST
K2APS to VE3BQN
Tuesday & Thursday at 1900 EST
W8BKI Charleston, W. Va. 144.247 to W8BAX
2130 EST (cw)
W8HOH Dayton, Ohio to W2SYU
0700 EST (Sunday) Rochester, N.Y.
W2ALR 144.040 to W8RMH 144.050
2145 EST

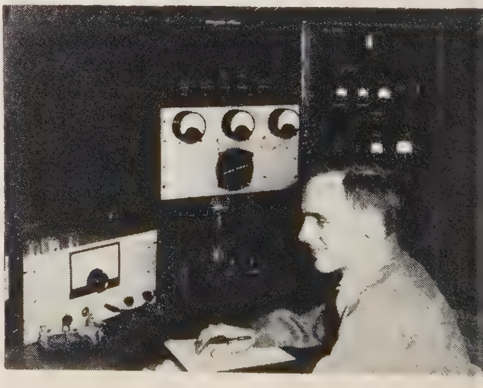
appears to be up maybe 6db from the
antenna. Good opening last night (9/28),
tions in Chicago area working into Buffalo
on phone; heard W9WOK working W3BN
Hagerstown, Maryland. Shortly after midn
EST, signals faded back to normal. Here
some exact frequencies, subject to a few kc
in most cases. Signals were heard in the last
nights. (Drift mentioned is that of transm
oscillators.)
W9JGA-144.007, W9KLR-144.018, W9JIY-
.017, W9EGH-144.025, *W9GAB-144.
W9QXJ-144.033, W8RMH-144.046, W9Q
144-082, W9QKM-144.100, W9GLR-144.
W9WOK-144.134, W9ZHL-144.145, *W9R
144.152, *W9HI-144.251, W8BKI-144.
W8LOF-144.238, W9VNW-144.272, W8L
144.128, W4VLA-144.159, W8SVI-144.
W9LXK-144.534, W3FPH-144.587
*Wisconsin."

*The aforementioned information should be
invaluable use to the VHF boys, Art. Than
million.*

Rensselaer, Indiana From Bill Rose (W9K
"Right now I'm running 350 watts to 4-12
and a thirty-two element beam. (Have a 1½
power trans to install soon.) I use a small
iable condenser (30μμfd) across crystal s
can "vfo" from 144.000 to 144.015, and 144.
to 144.110 with the two crystals I now hav
usually hang out on 144.015, and would s
like to hook up with a W1. Best bet on Au
this winter? I have never heard or worked
of W2UK and W2OPQ. *Attention, W1's.*

"I worked twenty-one States on two-me
last year with an 829 and a five over five
tenna, so I had hoped to do better with the
transmitter and antenna, instead, I haven't b
home when the band opened!

"Say, how about someone coming out wit
real good 417A converter? (Something I
buy real cheap and save myself the work
building, that is!) I'm using a *Techraft* wh
was good enough when using the 829,
doesn't have quite enough to copy the *Gon*
that call my higher power. What I really n
though, is some sort of circuit to balance



Front view of W2ALR (last seen from the rea
on Tony's tower).

the power line noise that I get from the 133,000-volt highline which is a hundred and twenty feet from the antenna!"

Well now fellas, there must be someone who's been working on a 417A converter. If not, why not? If so, why haven't you sent us some information, diagrams, pictures etc.? Aw c'mon, let's have 'em.

Bedford, Mass. Steve Morris (W1AQE) has come through again. *Thanks, Steve.*

"Please send more log sheets, ran out this month, will work at least two hundred contacts any month. *Hear that, gang?* Heard of your big score from MHL/1, congratulations. You sure have proved that big beams and power will work. New thirty-two element beam up thirty-five feet here now." *We're trying Steve, our trouble is that we're trying too many things at one time.*

California Our friend from the West Coast, A. Noni Moose sent us a clipping with the following:

"A real nice letter from W6SDM of Oxhard, California, with much info about the two-meter activity up North of the California border. Seems Mac took a trip up towards Seattle and Portland on his vacation, and tried a little 'Gonsetten' while doing so. He reports contacts with W7JHX, TES, QKE, SFO, EOP, PIE, LJA, USB and many others clear up into Canada. His letter reads like the W7 call book, believe thee me. Most of the Ops there are horizontal (horrible word) with everything from twelve to ninety-six elements. *How's come we never hear from this gang?* Mac reports also that W7JIP, Portland and W7LHL, Seattle, are beaming their signals toward Los Angeles each night at 9:20 PST and again at 9:30 on 144.15. Power used (hold ur hats) 500 watts at W7JIP and 800 to 900 watts at W7LHL. They want some high-powered boys to start looking for them with horizontal beams." *Well, Noni, we greatly appreciate these clippings, keep 'em coming.*

Clearfield, Utah Vic (W7QDJ) reports the following:

"Jump in my score results from increased activity in SLC and my switching to vertical polorization.

"Also increased my DX to sixty miles, Provo, Utah. He (W7TCC) was fifty-nine miles with only thirty watts so it is felt that this distance could easily be lengthened if there was more activity to the west, south and north. *Now boys, is the time to let Vic know that YOU ARE THERE.*

"Have been using a four element vertical beam. Soon will have a twenty-four element vertical. This Sunday, October 2, W7OWW and another station will be mountain-top portable. W7OWW near Provo, and the other near Malad City, Idaho. As this is less than a hundred miles, maybe I'll have another multiplier next month.

"Also am planning to make skeds with W7MWP at a TV station at Deer Point near Boise, Idaho. This would be 250-300 miles. Also will be on during the Geminids meteor shower, December 11-13. Near the low edge of two if I get my VFO-reactance modulator built or on 145.35. Power 200-400 watts. Polarization vertical.

"The average visible hourly count during this shower is sixty. During the Persids it was fifty-sixty. The height of the observed path of most Meteor Showers corresponds to the average E. layer. (100 km.) Therefore the best distance would be expected to be five hundred to a thousand miles. The book says that the showers appear to come from the constellation they are named after. So, when Gemini (Castor & Pollux) appears over the mountains to the SE (this is apt to be pretty late, midnight or so,) my beam will be on it. Also S & SW. Or, if I can get hold of some Nautical Almanac and Tables, maybe I will be more exact." *From the amount of 'looking up', studying, etc. that you must have been doing to give us this information Vic, seems like you ought to be able to write us a small article on the subject? How about it?*

Langhorne, Pennsylvania Ray Bilger (W3TDF) gives out in this manner:

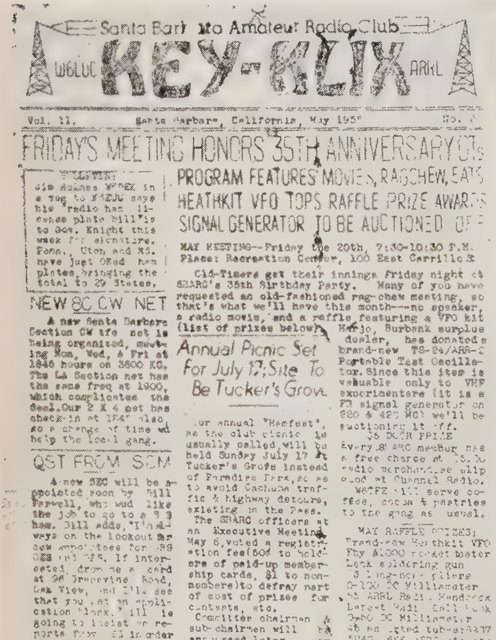
"The October 4th and 5th opening between Pennsylvania and New Jersey area and South Carolina was wonderful. When I last heard W4CPZ on 144.348 he was S8 on phone. I spent from 2300 until 0300 EST trying to get W1REZ hooked up with him. We are all Ray's, Hi. But as luck would have it, a wise guy in this area didn't want a Ct.-S.C. QSO made. Beer and hamming don't mix. *We agree with that Ray.* Understand it was open that way the night before but I didn't hear it." *We've run into that kind of competition, opposition, or what have you, too, Ray, but so far have not had to contend with it on VHF bands. Tough luck fella.*

[*Continued on page 106*]

"Whitey" Larkins, W8HOH. 417A converter is located just above the Panadaptor.

Club Newspapers Pay Off!

Walker A. Tompkins, K6ATX
2910 Foothill Road, Santa Barbara, Calif.



Santa Barbara Amateur Radio Club
W6LUC KEY-KLIX ARRL
Vol. II, Santa Barbara, California, May 1955 No. [illegible]

FRIDAY'S MEETING HONORS 35TH ANNIVERSARY OTs

PROGRAM FEATURES MOVIES, RAGCHEW, EATS
HEATHKIT VFO TOPS RAFFLE PRIZE AWARDS
SIGNAL GENERATOR TO BE AUCTIONED OFF

MAY MEETING--Friday the 20th, 7:30-10:30 P.M.
Place: Recreation Center, 100 East Carrillo St

Old-Timers get their innings Friday night at SBARC's 35th Birthday Party. Many of you have requested an old-fashioned rag-chew meeting, so that's what we'll have this month---no speaker, a radio movie, and a raffle featuring a VFO kit (list of prizes below).

Harjo, Burbank surplus dealer, has donated a brand-new TS-24/ARR-C Portable Test Oscillator. Since this item is valuable only to VHF experimenters (it is a F3 signal generator on 220 & 420 MC) we'll be auctioning it off.

W6TFZ will serve coffee, cocoa & pastries to the gang as usual.

MAY RAFFLE PRIZES:
Brand-new Heathkit VFO

NEW 8C CW NET

A new Santa Barbara Section CW tfc net is being organized, meeting Mon, Wed, & Fri at 1840 hours on 3600 KC. The LA Section net has the same freq at 1900, which complicates the deal.

QST FROM SCM

Annual Picnic Set For July 17; Site To Be Tucker's Grove

Our annual "Hamfest", as the club picnic is usually called, will be held Sunday July 17 at Tucker's Grove instead of Paradise Park, so as to avoid Cachuma traffic & highway detours existing in the Pass.

The SBARC officers at an Executive Meeting May 6, voted a registration fee (50¢ to holders of paid-up membership cards, $1 to non-members) to defray part of cost of prizes for contests, etc.

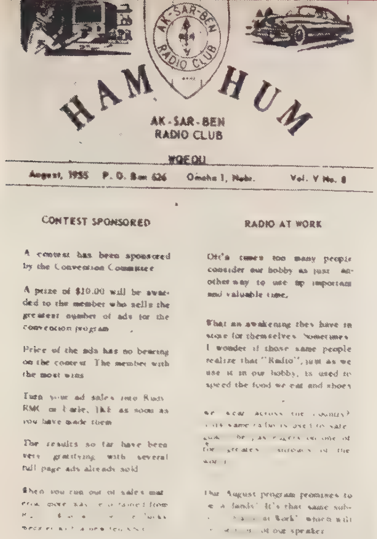
Committee chairmen & sub-chairmen will be announced later. Any volunteers, please?

Is your ham club attendance dropping off? Dues payments dwindling? There is nothing like a club newspaper to pep things up in a hurry. And the cost will run very little more than your club may already be spending on monthly post-card "bulletins".

Our own experience in the *Santa Barbara Amateur Radio Club* proves the point. Santa Barbara is a middle-sized town of around 40,000. We have about 175 licensed amateurs inside the city limits—which runs about true to the national ratio of hams to population. Of these, perhaps 100 are active, on-the-air operators—the others being OTs who rarely fire up their rigs, but who are reluctant to let their tickets lapse. But of the 100 active hams, only about 40 ever took the trouble to attend a monthly club meeting.

Being a professional writer outside the hamshack, I got the idea of converting our monthly bulletin—a mimeographed sheet announcing the speaker for the next meeting—into a full-fledged ham newspaper. We were already mailing a legal-sized sheet of paper to the gang, at 2¢ postage per copy. By spending an extra 15¢ a month for another stencil, we took advantage of the blank side of the sheet, cramming it with news. In less than a year we had to jump the total to four pages, to accommodate the incoming items.

The first thing to do to add prestige to a ham club bulletin is to give it a "hammy" name and adopt regular newspaper make-up. We call our paper *"Key-Klix"*. Each page has three columns, each 22 letter-spaces wide, with even margins on both sides. The headlines are not typewritten, but are etched onto the stencil with a needle-point stylus, using a variety of inexpensive letter guides which anyone can


HAM HUM

AK-SAR-BEN
RADIO CLUB

W0EQU

August, 1955 P. O. Box 626 Omaha 1, Nebr. Vol. V No. 8

CONTEST SPONSORED

A contest has been sponsored by the Convention Committee

A prize of $10.00 will be awarded to the member who sells the greatest number of ads for the convention program

Price of the ads has no bearing on the contest The member with the most wins

Turn your ad sales into Russ RMK or Earle, IKE as soon as you have made them

The results so far have been very gratifying with several full page ads already sold

RADIO AT WORK

Oft'n times too many people consider our hobby as just another way to use up important and valuable time.

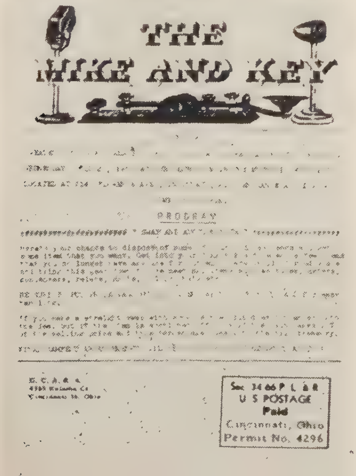
What an awakening they have in store for themselves. Sometimes I wonder if those same people realize that "Radio", just as we use it in our hobby, is used to speed the food we eat and shoes

use, regardless of artistic ability, to produce "type" as realistic as that used by a real printed newspaper.

Our *Key-Klix* resembles a miniature *CQ* Magazine, except we stress local names, local doings. The most important thing for your editor to remember is that NAMES MAKE NEWS. When a ham reads his name and call (don't just use his radio sign, use his full handle) in the club bulletin, in a story, about his new rig, latest DX or the new jr op at his QTH, he's a likely candidate to show up at the next club meeting.

Two years ago, when *Volume I Number 1* of *Key-Klix* went out to Santa Barbara hams, we had an average club attendance of 40. Now we run around 100, or higher, and our dues-paid roster has jumped by over 90%. Much of that increase is attributable to *Key-Klix*.

How much does it cost? You can figure on about 3½¢ a copy for ink, 20-pound paper, stencils, and postage. If you circulate more than 200 copies the post office will give you bulk-mail rates. You fold the bulletin and staple it, putting stamp and address on one corner of the back page, to save the cost of envelopes.


THE
MIKE AND KEY

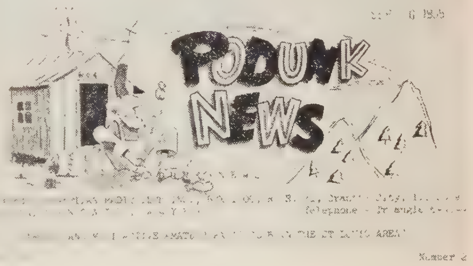
PROGRAM

Sec. 34.66 P. L. & R.
U S POSTAGE
Paid
Cincinnati, Ohio
Permit No. 4296

What goes into your club newspaper? News, obviously—and you'd be surprised how much gossip there is of interest in your own back yard. No item is too small to ignore: new calls, newcomers to the code class, local CD activity involving hams, new antennas, new gear whether store-bought or homebrew, births, deaths, marriages, vacation trips — anything that concerns hamming is grist for your mill.

In *Key-Klix,* we use cartoons on ham radio topics, contributed by a member. We print "Ham Ads" free of charge for those wanting to buy, sell or swap gear. Some clubs charge for these ads, but the good will engendered by opening your columns gratis more than offsets the financial gain you can expect. Local ham gear stores, surplus outlets, manufacturers etc. pay for display ads at $2.50 for a 4 x 4 inch space up to $20 for a full page. Don't let advertising over-balance your news columns, though.

The primary function of a ham club newspaper is to let the gang know about the next meeting's date, place, program, and raffle prizes. Mail it to reach members at least three days ahead of the meeting—but not too far ahead, or they'll forget to come. We mail *Key-Klix* to every ham in town, free of charge; some clubs restrict the paper to members only, but we feel that our most important job is to rouse interest in the club among those who haven't been showing up. We include out-of-town clubs in our circulation, too, and you'd be surprised how many visitors they attract, especially to transmitter hunts, hamfests, dinner meetings, and other special events.


PODUNK NEWS

Number 2

If one of your members has worked out a new circuit, print it. Ditto with novel gimmicks for the hamshack. We lump tidbit gossip into a column called "Tuning the Band" which is the most popular feature of the whole paper. Another department, "The OT's Junkbox", is full of nostalgic miscellany supplied by one of our old-timers.

If your club hasn't tried converting its regular bulletin into a real newspaper, you're overlooking a chance to really give local hamming a shot in the arm, and at very little expense. Why not try it in your club for a few months and convince yourselves that a ham paper pays fat dividends?

NOVICE

for the novice and technician

Reported by

Walt Burdine, W8ZCV
RFD 3, Waynesville, Ohio

Dear Readers of Novice Shack:

I have been asked many times why I choose ham radio for a hobby and why I still keep going strong after nine years on the air. I have been on the air nine years today (October 13th) and I still enjoy ham radio as much or more than the first QSO. I have amassed about 12,000 QSL cards from 90 countries and have a total of 104 countries to date. I have never had as much as a hundred watts on the air, thereby proving that you do not need high power to work DX. These contacts are all on phone except the stateside QSOs on CW, and they cover all bands of operation from 160 meters to 435 Mc. I believe the foregoing will prove to you that I am an avid ham.

When choosing a hobby you will just naturally fall into one of three categories: Those collecting something, those building something or those doing something. The ham radio operator does all these things. He collects QSL cards from fellow hams plus a good deal of radio parts and assorted gear. He also collects quite a following of friends in countries all over the world, if he is a well liked ham. He builds his transmitter and some hams build their receivers, plus antennas and any small pieces of test equipment needed in the operation of the station. Ham radio is the most complicated hobby, both technically an politically. Our hobby is governed by the International Amateur Radio Union—it is not national hobby. All governments of the worl have special bodies to form rules governin the operation of amateur radio stations. Amateur radio is a scientific hobby, a means to fin out for ourselves the entertaining technical aspects of electronics.

Operating desk at W8ZCV, with Walt at the controls. (see page 63)

Probably no other hobby in the world has a many commercial interests eyeing our asset and our liabilities as does ham radio. No othe hobby in the world can serve the public a adequately and as fully as does ham radio. N other hobby can or has helped the advance c electronics as has ham radio.

Tradition and squatters rights are not th things that are keeping our amateur frequencie clear for us—we must pay for these priv leges by our continued services to the publi We pay for these privileges by our contributions to the advancement of the art of electronic engineering, by our contributions to th art of radio communications, traffic handlin our friendly chats with our neighbors aroun the world. Our hobby has a back log of traine radio operators ready for National disasters c threats to our way of life in any form. We ca aid in forming a good opinion of our way c life in the eyes of those in other countries. W can learn a lot from them, too, that might hel us to understand them better. Our ham fraternity can help maintain world peace an sobriety. That could be our greatest contribution. Those are a few of the reasons I choos to remain within the ranks of busy hams. Any way I like to make friends on the air or off.

Novice 15-Meter Band

A letter from Mary Jane Morris, Secretar to the Federal Communications Commissio calls our attention to the fact that the novic section of the 15 meter band was incorrectl printed in the August issue of *CQ*. **Novic Class licensees may operate in the segment 21 100-21,250 kc, not 21,000 to 21,250 kc a indicated in the article.** I wish to extend m thanks to her for the note.

Youngest and Oldest . . . So Far

In the September issue I asked for a letter from some of you novices as to your age, you might like to know the results. The youngest novice to write was Bruce Arnold (9) KN9AKE, 41 Louise Street, Jeffersonville, Indiana. The oldest novice to answer the call was Oscar G. Weed, WN7ZKJ, Vernonia, Oregon. Oscar is 74 years young. I am sure there are older and younger novices than these, let me hear from you soon. This should prove to you that you are not too old nor too young, so get in there and get that ticket and write me a letter. Thanks to those who took the time to write, to the one who took the trouble to come personally to see me. Leavitt B. Glaze, KN6MLC, 6034 Condon Avenue, Los Angeles 56, California. Lee, you were edged out by a few years, nevertheless I enjoyed the visit. I also enjoyed the visit of Walter Salber, W9LOR and Irving "Hap" Hazard, KN9AXW of Chicago, Illinos.

Safety

The most important part of the layout of the new amateur radio station is the provision made for the protection of the personal safety of the operator and his visitors during operation of the station. The transmitter proper should be mounted in a metal cabinet and the entire cabinet and all chassis mounted therein should be **grounded** to an earth ground or a waterpipe leading to the ground. Do not connect to a gas pipe. No metal object near the transmitter should be ungrounded. This includes the metal trim around the operating desk. **NEVER** change coils in the transmitter without first shorting the filter condensers to make sure that the bleeder resistor in the power supply has not opened up leaving the charge in the condensers. **BE SURE** the switch to the a-c line is **OFF.** All a-c lines should be adequately fused to protect the expensive power supply components. **NEVER** operate the transmitter when you are tired or sleepy, as this increases the danger factor. **NEVER** operate the transmitter when you have been drinking. **ALWAYS** work with one hand in your pocket when working on any electrical equipment. **BE CAREFUL: DEATH IS PERMANENT.**

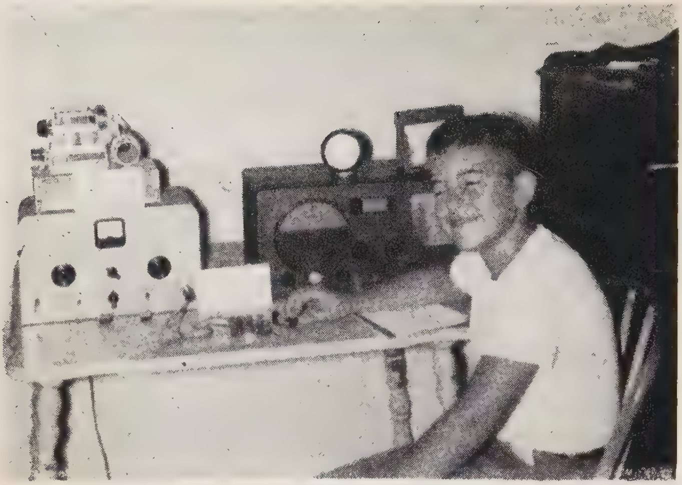
Power Supply

This month we will go into the theoretical and functional operations of the power supply. A power supply is needed for any transmitter, received or any piece of test equipment. A power supply must be able to furnish different voltages and currents for all the different parts of the circuit. Some of these can be the alternating current and some will have to be

Technician, Dr. Archibald Connor, W8OWV, Oak Park, Michigan is (I believe) trying to keep the title of the oldest and youngest ham in the family. The novice is listening for DX.

46 states and 7 countries in 90 days was worked with this nice homemade novice station on 40 meters by Henry W. Gould, KN4CQA, Portsmouth, Virginia. You hams in MONTANA and WYOMING help Henry get his WAS when he is home on the holidays.

Dick (15) WN3CXJ, Morrisville, Pennsylvania is a brand new Ham and in three weeks has worked 11 states. That sure is a nice layout, Dick.



This big smile belongs to Dave, KN4BDE, Rome, Georgia. He is 13 and has worked 24 states in about two months.

rectified and used as a source of direct current supply. Three different voltage supplies are needed in most equipment. The *A* voltage is used to heat the filaments of the tubes, it can usually be alternating current and can be obtained from a low-voltage winding on the power transformer. This winding is referred to as the filament winding and is the winding with the heaviest wire, due to the fact that it carries the most current. The *B* voltage is used to supply the plate or anode voltages and is usually the highest voltage on the transformer and the lowest current flows in this winding. The *B* voltage must be rectified and filtered to supply direct current. The amount of alternating current component left in the *B* voltage after filtering determines the hum level in the output of the equipment powered by that power supply. The *C* voltage is used to supply the bias voltage for the tubes and must be a well filtered direct current supply. In small equipment this voltage is obtained from the *B* supply by placing a resistor between the cathode and the ground or *B*– terminal. This puts the cathode at a potential that is negative with respect to the ground or *B*– terminal. The *B* voltage is measured between the cathode and the plate of the tube and the cathode is the negative side. We shall now proceed to explain the function and operation of each component of a power supply and tell how to design a power supply.

All a-c operated power supplies may be divided into four parts: The transformer, the rectifier, the filter and the bleeder or voltage divider system. We can now proceed to discuss the various components in detail.

The transformer provides a means of increasing or decreasing the voltage as needed for the different parts of the circuit by transformer action. One of the laws of electricity says: if a wire is moved within a magnetic field, a voltage will be induced in that wire. Another way to say the same thing is: A changing magnetic field will induce a voltage in a wire located therein. This is called transformer action. The transformer consists of a core o magnetic material wound with copper wire (o other metallic conductor). The windings o wire are all insulated from the core. The winding into which the input voltage is fed is calle the primary, the rest of the windings bein called secondaries. The voltage of the secondaries is proportional to the *turns ratio* of th windings. It can be either higher or lowe than the primary voltage. The current in th primary is proportional to the current draw from the secondary. Usually two or mor transformers are used in a power supply. Th one supplying the high voltage is called th plate transformer, and the ones supplying th filament voltages are called the filament transformers. The power supply is usually the mos expensive part of a transmitter. The plat transformer is the largest single component i a transmitter.

Transformers can never be used on direc current, which would quickly ruin them. Thei function depends on the use of alternatin current.

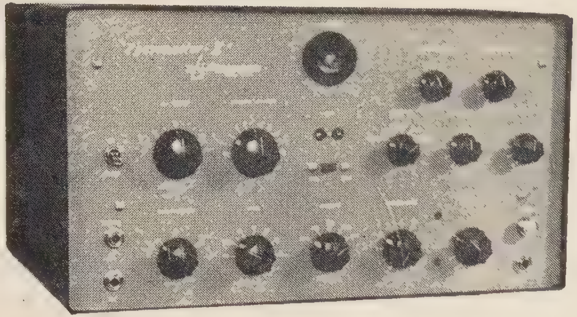
Rectifiers

If certain metals, or metallic substances suc as metallic *oxides*, are heated to a high temperature by passing a current through them they have the property of throwing off, c emitting, electrons.

The element in a vacuum tube which heated is called a *cathode*. Two types of cathodes, or emitters, are used in radio tubes. I one, known as the *filament* or *heater* type, th heating current (usually a low voltage) passed through the cathode itself. In the othe the *indirectly* heated type, the current flow through the filament (a heating element) whic in turn heats the cathode to a temperature hig enough to emit electrons. In the indirectl heated type, the cathode is an oxide-coate sleeve placed around the filament or heate element. In our power supply we will be co cerned only with the diode, a two element tub

here's the ULTIMATE for ALL amateur communications

AM—PM—CW and SSB . . . the "Phasemaster-II"



phasing type exciter—AM—PM—CW and SSB with switchable sidebands at the flip of a switch—75 W PEP output—completely bandswitched 160 thru 10 meters—wide range pi-network output—fast operating built in anti trap voice control circuit—rounded corner black crackle cabinet with gray front panel, black knobs and white screening—separate phone patch and mike inputs—accessory power socket for accessory equipment—COMPLETE internal shielding including solid shielding for final tank assembly to give stable operation—no critical external carrier balancing controls—new carrier insertion control—new variable calibrating control for zero beating frequency—new eye circuit for precision operation—40 DB or better unwanted sideband suppression—no mixer stage tuning ELIMINATES OUT OF BAND OPERATION—2 additional sets of relay contacts on rear chassis—wired and tested with all tubes or in kit form—a complete wired, tested and ALIGNED audio thru balanced modulator subassembly is furnished with the kit this allows the balance of transmitter to be built as simply as a CW rig-all operating controls on front panel Audio Gain, Carrier Level, Emmission, Bandswitch, Buffer Tuning, P A Tuning, Antenna Loading, VFO—CRYSTAL, Function, VC Gain, AT Gain, Indicator Level, Calibrate Level and Eye Indicator.

$329.50	Wired and tested
$279.50	Kit form

TIME MASTER

115 V AC continuous gong timer—pleasant gong strikes automatically every 10 minutes—can be reset to start at any time — dial indicates 10 min time duration—compact molded black case ($2\frac{3}{4}$" x $4\frac{1}{8}$" x $2\frac{5}{8}$") with lithographed front face—meets FCC regs 12.82 (a) (1) (iii) & (iv) for 10 min identification requirement — complete with off-on switch and cord—DON'T GET A PINK TICKET **$7.95**

Write for special electronic, electrical or mechanical timer requirements

TONE MASTER

SELF powered, transistorized audio SINE WAVE generator — approx 1200 cycle tone freq—variable from 0 to over .5 volts RMS output with calibrated dial—connects directly to HiZ mike input to provide two tone test for SSB or for checking AM modulation and speech equipment—ideal for audio enthusiasts—portable, can be hand held—A MUST for every shack or service man—no need to buy expensive bulky audio generators—housed in compact black molded case ($2\frac{3}{4}$" x $4\frac{1}{8}$" x $2\frac{5}{8}$") with lithographed front face

$12.95

Lakeshore INDUSTRIES

408 COMMERCIAL STREET MANITOWOC, WISCONSIN
MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

A single 6L6 and an S38-A plus lots of good operating practice enabled Blake Fishburne, KN4EJR, Sumter, South Carolina to work 21 states on 80 CW. in two months on the air.

comprised of the filament (heater) and the plate, or anode.

The diode is a *conductor* when the plate voltage is positive, and it is a nonconductor when the plate voltage is negative. This property of the diode lets us use the diode for *detection* and *rectification.* The cathode emits electrons, negatively charged particles of electricity. One of the laws of electricity says: *Like charges repel, unlike charges attract.* Therefore if a plate with a positive charge on it is placed near the cathode, a flow of free electrons will result. This condition of flowing electrons is called *conduction.* It should be noted that electrons travel from "negative" to "positive."

We shall center our discussion around the vacuum-tube rectifier in this power supply. Rectifier tubes are made in both *half-wave* and *full-wave* types. When using half-wave rectification the ripple in the output of the rectifier is the same as the input frequency. In a full-wave rectifier circuit the ripple frequency is *twice* the line frequency. The output voltage of a full-wave rectifier is easier to filter, due to the higher frequency of the ripple component of the pulsating direct current.

The Filter System

The filter system smooths out the *pulsating direct current* component as supplied by the rectifier and makes it *nearly pure direct current.* The components of the filter system are called condensers (capacitors) and chokes. We shall go into more detail about each of these parts. The choke is a fixed inductor that offers a high reactance to the flow of alternating current, while it shows a low resistance to the flow of direct current. By this action, the choke coil will easily pass direct current but will tend to block or "choke" off the passage of alternating current. Large iron-core choke coils are used in the filter system of a power supply circuit.

You might say a choke coil *stores up current* and that a condenser *stores up voltage.*

Choke coils used in filter circuits are called *filter chokes.* Chokes are made by winding a multi-layer bank of wire on an iron-core enclosure. The wire must be insulated from the core material sufficiently well to withstand the maximum (peak) voltage supplied by the rectifier. This maximum voltage is usually about one and one half times the voltage (1.41)
measured at the rectifier output. The lar
the inductance the better the filtering act
afforded. The unit of inductance, the *hen*
is used to tell the inductance of a choke. T
resistance of the choke will determine the v
age drop across the choke. A swinging ch
changes its inductance *inversely* with an
crease in the amount of current drawn throu
it. The use of a swinging choke improves
voltage regulation of the power supply wh
the load on the output is of a variable natu

The Filter Condenser

A *capacitor,* commonly called a condens
is a circuit element designed to introdu
capacitive reactance in a circuit. The unit
capacitance is the microfarad (μfd). An
microfarad condenser is commonly referred
by radio men as an 8 *mike* condenser, v
rarely as an 8 microfarad condenser, and ne
as an 8 mf condenser. The condenser pas
(for our purpose) alternating current a
blocks the passage of direct current. The
pacity of a condenser determines the amount
a.c. that it will pass. The primary purpose o
filter is to remove the *alternating compone*
of the *pulsating direct current* and to pass
direct current through the filter network. T
amount of a.c. component left on the high v
age at the output of the filter will determ
the hum level in our equipment. Condens
used in filter circuits are commonly called fil
condensers. The voltage rating of a conden
used in the filter should be high to prevent
being ruined by too much voltage causing it
short out. The voltage ratings are called *pe*
voltage and *working voltage.* The *work*
voltage should be at least one and one h
times the rectifier output voltage. There v
be a good deal of heat generated by compone
in the power supply and this can cause
ruinous effect upon the filter condensers unl
sufficient ventilation is provided.

Bleeder Resistor

A *bleeder* is a resistor connected across
output terminals of the power supply. It
used to place a minimum load on the pov
supply. The value is usually chosen to dr
about ten percent of the output current. T
primary purpose of the bleeder resistor is
discharge the filter condensers when the pov
supply is turned off. The wattage rating of t
resistor is usually fifty to two hundred watts
it should burn out and not discharge the fil
condenser a nasty shock and possibly de
might result from coming in contact with
high voltage stored in the filter condenser.

There are a few things to remember fr
the above. A. Electron flow is from negat
to positive. B. Like charges repel, unl
charges attract. C. The resistor offers the sa
resistance to the passage of either AC or D
D. A condenser passes AC and blocks D
E. An inductor passes DC but tends to bl

[*Continued on page 90*]

a Ten-Meter Crystal Receiver

D. B. Angel, W8DBF
Rt. 1, Port Washington, Ohio

Chances are there have been many times you'd have found a pocket-sized hamband receiver a very handy assist. In erecting antennas, checking field strength, adjusting elements, checking TVI, or for just plain eavesdropping in the vicinity of a ten-meter transmitter, this little crystal receiver will prove itself a worthwhile evening's project. If you get tired of listening to the station, you can plug in a meter and watch it for a while. This unit doubles as a field-strength meter.

The original ten-meter crystal receiver pictured here is housed in a 3 x 4 x 5 utility box which happened to be on hand, but a smaller box is large enough, and in any case all parts are mounted on one cover. The back cover supports a sheet metal clip, bent to hang the receiver from the belt.

A 50 μμfd APC screwdriver type capacitor was chosen, since the bumps and jars of portable use might require frequent resetting if a shaft type were used.

The coil is composed of eight turns from a *#3003 B & W Miniductor,* with four turns of #22 enamel wound on the ground end for the antenna link.

A short cowl mount auto antenna was found adequate, and is conveniently compact when telescoped.

The circuit is a standard one for crystal receivers, and leaves small room for comment, except perhaps the usual reminder to use care in soldering to the germanium diode leads.

The unit was used recently to position a TV antenna located seven hundred feet away, and out of sight of the shack. It was possible for the operator to observe the screen and report via the shack transmitter when the antenna was properly aimed for best reception.

Parts list

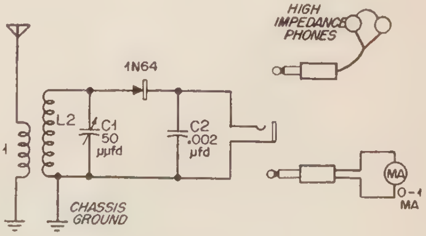
L1—4 t. #22 e. on gnd end of L2
L2—8 t. #20 e. ½″ dia. ½″ long (B & W #3003)
C1—50 μμf APC screwdriver type (Hammarlund)
C2—.002 ceramic or mica (Erie)
Germanium diode 1N64 (GE)
Utility box 2 x 2 x 4 (Bud)
Two section side cowl auto antenna (Ward)
Single circuit phone jack

Using a ten-meter transmitter with a power input of 60 watts to a 3-element beam, good reception was obtained half a mile away over hilly terrain. On level ground the receiver should be useful at greater distances.

By replacing the headphones with a 0-1 milliammeter the device becomes an effective field strength meter. For purposes of adjusting antennas it serves admirably in a dual capacity, both as a receiver and a field strength meter.

To prospective builders of this unit the author suggests the possibility of providing plug-in coils, making it an "all band" receiver, the adaptation to hidden transmitter hunts and the many other uses which may be found.

I hope you have as much fun with your ten meter crystal receiver as I've had with mine.



Circuit for the ten-meter crystal receiver.

AC. F. A voltage divider system is used to obtain the various voltages for plate, screen and control-grid voltages. G. Bleeder resistors, because the dissipated heat is high, should be mounted to allow free circulation of air around it to carry off the heat. H. *Lethal potentials* are encountered in power supplies, **BE CAREFUL: DEATH IS PERMANENT.**

A Power Supply for the Work Bench

A power supply to use around the shack is shown here to help you when you are experimenting. The output voltage of the power supply will determine the use to which you put the unit. The B plus voltage for a receiver will have to be near 250 volts at about 100 milliamperes and for a transmitter the voltage will have to be anywhere from 300 to 3000 volts. The higher voltage will not be used by the novice, it would also require a different circuit. I would suggest you use any transformer that you might have lying around. If you have to buy one get one to serve the purpose to which you intend to put it. If the transformer you choose has a total secondary voltage of 700 volts or less you can use condensers with a 450 volt working voltage rating. The chokes will have to be of a rating that is high enough to carry the number of milliamperes in the transformer rating as supplied by the manufacturer. The resistor used by the bleeder system should be at least 25 watts for a low-powered unit and 50 watts or more for a high voltage power supply. The resistance should be between 25,000 and 50,000 ohms. The rectifier can be either a 5Y3 or a 5U4, depending upon the amount of power drawn from it. *SW-1* is used to control the filaments of rectifier and the filaments of the tubes in the unit which this power supply powers. Switch *SW-2* is the *standby* switch and can be used to cut off the high voltage when the B plus is not needed, still leaving the filaments hot.

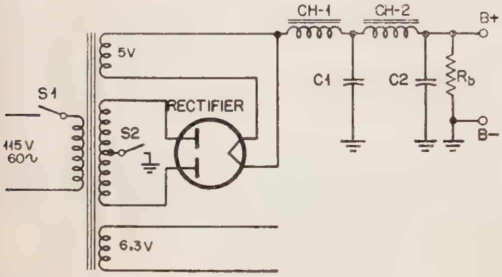


Fig. 1. Power Supply schematic.

C-1, C-2, 10 μfd 450 volt condensers.
Rb, 50K 20 watt wire wound resistor.
CH-1, CH-2, see text.
Rectifier, see text.
Transformer, see text.

The condensers are chosen to be used with a transformer of 700 volts or less total voltage.

This power supply can be used with converters, small amplifiers, exciters for transmitters, low-powered transmitters and receivers. The hum level will be low enough for use in any place that needs direct current. If the hum level does not need to be so low, choke *CH-1* can be omitted. Socket connections can be found in the handbook section on tubes. I would suggest that you use your handbook for the answer to most of your questions. That's what the handbook was printed for.

Letters to the Editor

Finally a letter came in from West Virginia. James Hamilton, WN8BZY, Chapmanville, West Virginia, writes:

"Dear Walt, I have a *Globe Scout 65-A* and an *S-38-C* receiver. I am interested in 15 meters and will make any skeds with anyone needing West Virginia. I QSL and SWL 100%. With a ten watt rig I have worked three states. I have cards from 47 states as an SWL. 73 and good luck with the novice shack. James."

Another from West Virginia says: "QTH: Bill Turner, WN8EYP, 111 Carter Street, Beckley, West Virginia.

"Dear Walt: I have had my ticket for two weeks and have 13 states with 9 confirmed. The rig here is a *Heathkit AT-1* and the receiver is an *S-40-B*. I would like to arrange skeds with W/K 1, 5, 6, 7, 0 amateurs or anyone needing West Virginia for WAS. 73 Bill."

Phil Krichbaum (15), WN8TTN, 112 Overwood Road, Akron 13, Ohio writes:

"Dear Walt: In about 11 months as a novice I had about 500 QSOs in about 40 states, WH6, KP4, KV4, and VE. The transmitter is an *AT-1* running about 35 watts to a 130-foot piece of wire by way of a home built antenna coupler. The receiver is a home converted broadcast receiver with a Q-multiplier. I would like to make skeds with Colorado, New Mexico, and The Dakotas. I am reasonably sure that I passed my general license and will probably have it by the time this is printed. I will also sked anyone who needs an Ohio QSL. I usually am on the air on 7188 kc. before 0700 weekdays and from 0300 to 0600 Saturdays and Sundays. I hear about ten KN6s for every WN7, let's have some WN7 activity. 73. Phil."

New Jersey is represented this month by Dennis Schultz, KN20NU, 185 Park Avenue, Passaic, New Jersey.

"Dear Walt: I've had my ticket for about two and one half months and in that time I have worked 20 states, mostly on 40 meters. My rig consists of a *Health-kit AT-1* transmitter, an S-85 receiver and an off-center-fed Hertz antenna. I would like to sked someone in Delaware. I operate mostly before I go to school. How about a QSL of the month? 73 Dennis."

Novice QSLs are eligible for the regular QSL of the month in CQ.

"Ted" Tahmisian (13) W9JFN, 7654 Michigan, Chicago, Illinois writes:

"Hi Walt: I'm 13 years old and in the eighth grade. I applied for my novice license in July 1954 and in May of this year the postman

NEW MULTIPHASE "Q" MULTIPLIER

- Peaks Desired Fone or CW Signal
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- No Insertion Loss — New Two Tube Circuit
- Special High "Q" Pot Core Inductor

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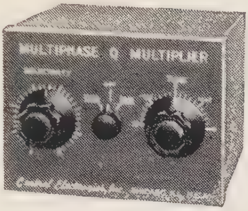
Plugs into Model A accessory socket, converting it into a Model B. New front panel and controls provided. Enjoy all the advantages of "Q" Multiplier selectivity on CW, AM & SSB with your present Model A Slicer.

Wired	$29.50
Kit	$22.50



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Desk Model "Q" Multiplier for use with any receiver having 450 to 500 KC IF. In attractive, compact case with connecting power-IF cable. Power supplied by receiver. Also provides added selectivity and BFO for mobile SSB or CW reception.

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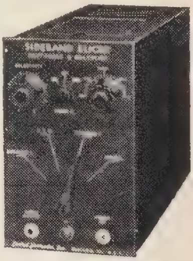
Kit	$22.50



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BUILT-IN "Q" MULTIPLIER

Upper or lower sideband reception of SSB, AM, PM & CW. For use with any receiver having 450-500 KC IF.

Wired	$99.50
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Same as Model B but less "Q" Multiplier

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- New band-pass couplers provide high linear efficiency: 60-65%.
- Designed for 50-70 ohm coaxial input and output.
- Built-in power supply. Bias and screen regulation. Automatic relay protection.
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- Completely shielded — TVI suppressed. Free of parasitics! Low intermodulation distortion.
- Choice of grey table model (17⅝"W, 8¾"H, 13"D) or grey or black rack model.

Wired, with tubes $349.50

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- Perfected Voice-Controlled Break-in on SSB, AM, PM.
- Upper or Lower Sideband at the flip of a switch, with 40 DB. suppression.
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- New AF Input Jack. For oscillator or phone patch.
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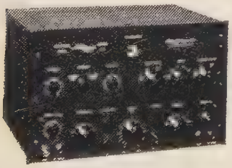
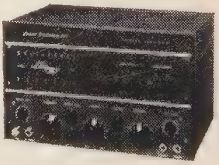


MODEL 20A

- **20 Watts P.E.P. Output SSB, AM, PM and CW**
- **Bandswitched 160 — 10 Meters**
- **Magic Eye Carrier Null and Peak Modulation Indicator**

Choice of grey table model, grey or black wrinkle finish rack model.

Wired and tested	$249.50
Complete kit	$199.50



MODEL 10B

- **10 Watts P.E.P. Output SSB, AM, PM and CW.**
- **Multiband Operation using plug-in coils.**

Choice of grey table model, grey or black wrinkle finish rack model. With coils for one band.

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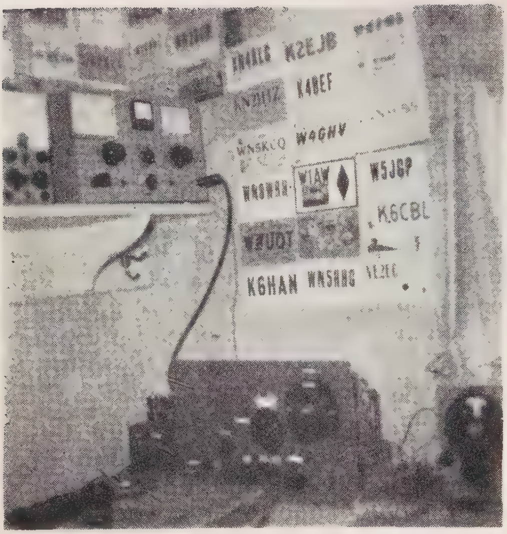

Phil Krichbaum, WN8TTN, Akron, Ohio has used this layout to make over 500 contacts in the last 11 months. He has graduated to a general by now.

brought me my general license. My favorite band is 40 CW, you can find me anywhere between 7.0 and 7.2 Mc. I do say 40 meters is quite popular with the novices since they were granted the extra 25 kc to operate on. It's a great band for DX and WAS. The rig here is a *VF-1* and an *AT-1* combination and an *NC-98*, all working FB. Good luck and 73. Ted.

The first letter from South Carolina comes from Blake Fishburne (15), KN4EJR, Box 1609, Sumter, South Carolina. Blake writes:

> "Dear OM: I have been reading, "The Novice Shack", for several months now. I read all about hams that work 20 or 30 states on *Heathkit AT-1* transmitters running 35 watts input, some have good receivers. Well I just wanted to tell you that I am 15 years old, I have worked 21 states on 3.7 Mc with a home-made transmitter using a single 6L6. My receiver is an *S38-C*. The transmitter runs 24 watts input. The antenna is a 130 foot doublet, it is made of steel wire. I have no antenna coupler. I am very pleased to have worked 21 states with that equipment, because I have only been on the air exactly two months today. I enjoy reading "The Novice Shack" very much. 73. Blake. P.S. I have worked all the W4, W8 and W3 states, B.F.

Georgia sends its representative to the meeting of the writers of the Novice Shack in the letter from Dave (13) KN4DBE, 5 Morningside Drive, Rome, Georgia. Dave writes:

> Dear Slightly Old Man: I hope I am the first one from Georgia to write you though I hope others soon will follow. Everything is
> fine at KN4DBE right now. The rig here
> a *Heath-kit AT-1* running 35 watts on 40 ar
> 25-30 watts on 80. The receiver is a *Hall*
> *crafters S40-A* in desperate need of realignmen
> Half-wave dipoles are used for 80 and 4
> meters. My story isn't one of great succe
> 119 QSOs since July 8 in 24 states. My coc
> speed is approximately 13 words per minu
> now. I will QSL any one who works me. 7
> Dave."

Henry W. Gould, KN4CQA, 9 West Rang
University of Virginia, Charlottesville, Virgin
writes:

> "Dear OM: I have been meaning to write fo
> some time and report on activity here on 4
> meter CW—novice style. I operate as KN4CQ
> with QTH: 422 North 6th Avenue, Portsmout
> Virginia. In about 90 days I worked 4
> states and the following DX all on 40 CW
> VE2, VE3, CM2PX, XE1KB, KN4AZY/VP
> KV4BK, WH6BLI and WH6BPE. I have ju
> returned to Charlottesville, 170 miles fro
> Portsmouth, to finish my last years work an
> thesis for my M.A. degree in pure mathematic
> I will have my WAS if I can get home Thank
> giving and Christmas and work *Montana* an
> *Wyoming*.
>
> My rig is home made using two 807's
> parallel with a 6L6 clamp tube. The antenn
> is a doublet 25 feet high and oriented north
> east by south-west. The receiver is a modifie
> *S19-R* which I bought in 1941 for SWL wor
> The receiver runs 24 hours a day to reduc
> drift to a minimum. It has preselectors, soupe
> up "Q circuits", ANL, etc., all home brev
> This receiver works very, very good, howeve
> I am not one to turn down a *75A4, HRO-60*
> a *Super Pro* if such were available to m
> limited pecuniary situation. We grind our ow
> crystals from old cheap surplus FT243 crysta
> around 6200 to 6800 kc. Grinding your ow
> crystals is fun and saves a lot of moola.
> learned to bevel the edges to increase th
> activity. I ground a 6200 kc. crystal to 719
> kc. with little trouble. However due to th
> sluggishness of the crystal I leave the oscillat
> running all the time and key the buffer an
> the final amplifier only. The theoretical en
> is well under control. I have my first cla
> radiotelephone ticket and my technician cla
> amateur license. Sincerely, Henry.

Glenn Camp (17) KN6LOP, 3257 A Po
Street, South Gate, California writes:

> "Dear Walt: I got my license in June b
> am just now getting started after assemblin
> the shack. I use a *Heath-kit AT-1* running 4
> watts to an *AC-1* coupling to an end-fed Zep
> 73 feet long and 35 feet high. The inhaler
> a *Howard 435*. I would like to know if any
> your readers can tell me how to make
> sharper. At high school we have a noon ho
> radio club, the members calls are K6DGV
> K6HXX, K6ICS, KN6IXL and KN6LOP.

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8450 8475 8500 8525 8550

No Substitutions.

Kit B Reg. $19.80 **$8.95**

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Available in FT-243 ½" spacing, pin diameter .093" and in DC-34/35 ¾" spacing, pin diameter .125" or .1875. Freq. listed in KC. Please state pin size and type of crystal when ordering.

Each $2.99 Please add 5¢ per crystal for postage and insurance.

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am corresponding secretary of the *South East Amateur Radio Club* and am active in RACES. I operate 80 meters (3713, 3731 and 3742) and will sked anyone needing California for WAS. I QSL every contact and will answer all letters. 73, Glenn. P.S. I enjoy *CQ* more every month and think you have the best articles for the novice. G.C.

Iowa's delegate, Lyle Mattes (15) KN0 BMF, Hamburg, Iowa writes:

> Dear Walt: I just thought I'd let you know what is going on in Iowa. I have had my license three and one half months. In that time I have worked all call areas and 21 states, my best DX is KN6, 1440 miles. My rig is an *AT-1* transmitter and an S38-D receiver. I use two Windom antennas. W0MZM, Jay Dougan, my history teacher, gave me my test. He has a radio class in school. Ray, KN0AQX and I are assistant radio teachers. I am 15 and a junior in high school. I will be glad to sked any one needing Iowa for WAS. 73, Lyle.

Dr. Archibald Connor, W8OWV of Oak Park, Michigan writes this nice letter:

> "Dear Sir: I am enclosing a photo of the junior operator and assistant in the operation of the rig. The receiver is a *Hallicrafters S40-B*. The transmitter is home made with the assistance of W8IPR. I have retired in 1953 (Chiropractic Physician for 31 years). So as a hobby I took up amateur radio at the age of 65. I got my novice ticket in September 1953 and the technician in August 1954. I took the general examination in September 1955—passed the code but failed the theory. I didn't have my rabbit's foot with me that day. We are off the air until we get the general, failing that we will go on six meters. I like your magazine very much. Your Novice Shack is ideal for those of us who are in search of that elusive prize—the general, and, in my case, becoming a radio ham at this late date in life. Yours truly, Archibald Connor."

Ralph R. Winship (26), KN2LLL/K2LLL, Little Valley, New York sends along a very newsy letter, part of which I include here:

> "Dear Walt: I got my ticket March 4, 1955 and as of now have 164 QSOs in 15 states and one VE3. Along with ten other people I got my ticket as a result of an adult education class in Randolph, New York. Our instructor, John, W2PTC, intends to start another class for novices and also for generals in the Randolph Central School in Randolph. My *HQ-120-X* receiver was struck by lightning on August 17th to the tune of $75, but it was insured. The factory really fixed it up right. My antenna is a 126-foot center-fed with surplus telephone drop wire which is about 75 ohms impedance. I would like to know how many technicians are on six meters in the state, if there are enough to pay I will get on the six meter band. I will help any one in Western New York to get his license. I hope to work you sometime on novice CW or possibly on six meter phone. I am 26 years old with a wonderful wife and three sons. I am a radio operator for the Cattaraugus County Highway Department. Yours truly, 73 Ralph.

Bob Hardie (16) W5EUQ, 2216 Bluff Avenue, Fort Smith, Arkansas says:

> "Dear Walt: I am an official observer and wish you would explain that the O.O. does not send any pink slips or suspend any licenses, we just notify them that they are having trouble and send them a notice so that they know it and to save them from getting a ticket from the FCC. Ours is an amateur service for the amateur only. Incidentally novices are not the only ones that operate with harmonics outside the amateur bands, generals do too. I worked 46 states, 3-WP-4, VE-1, 3, 4, 5, 6 8, WH6 and an XE2 in 4½ months as a novice. At the time I was running either 6 or 30 watts. Half or more of the 46 states were worked with the 6-watt rig and a folded dipole.

[*Continued on page 116*]

Look at those QSL cards belonging to the owner of KN2LLL/K2LLL. He is Ralph R. Winship, Sr., Little Valley, New York. He is a radio operator for the Cattaraugus County Highway Dept.

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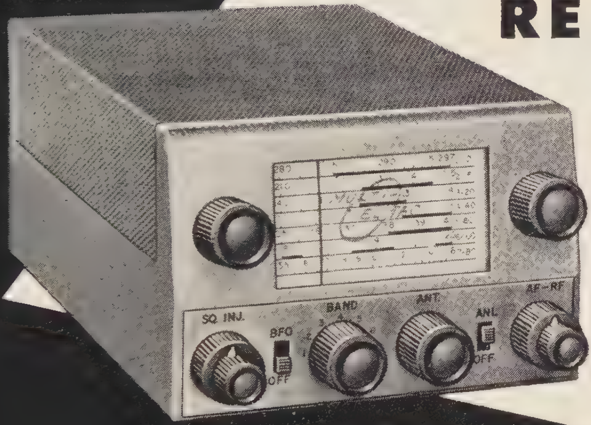

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Actually, down deep in your heart you knew that our present subscription rate wasn't going to last. It couldn't, really; figure it out. At 50¢ per on the newsstand that comes to $6.00 per year. A reasonable yearly subscription rate then should run around $5.00. We are anxious to encourage subscriptions as much as possible though and therefore have decided to make the new rate only $4.00 per year, two years for $7.00, and $10.00 for three years.*

CQ is going to continue in its new giant size and may, if the subscription list continues to grow, expand even more. All sorts of things are in the works.

Being Christmas and everything and feeling a bit yuleish we will give you one last chance to pick up a real bargain. Until January you can subscribe or extend a subscription to *CQ* at the old rates of $3.00 for one year, $5.00 for two, or $7.00 for three. You had better ask for a complete psychoanalysis for Christmas if you don't flip $7.00 in an envelope right now and extend for three years. Even if you are paid up to 1960 this is a buy that you will want to take advantage of.

Want to make friends? Subscribe for them too. Stop losing back issues to borrowers, see that they have their own library. Make everybody love you. Be generous, send us money. The form faces this page so set to it.

—W2NSD

P.S. If you are reading this in January or later forget the whole thing—you goofed.

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*The above rates apply to U.S. Possessions, APO, FPO, Canada, and Mexico. Pan-America and all other foreign: 1 yr. $6; 2 yrs. $11; 3 yrs. $16.

LETTERS TO THE EDITOR

[*Continued from page 69*]

Reported two cars, one full of little kids who came across the dam, stopped, got out and started enjoying the scenery. They were promptly chased.

The water all this time seemed to be holding at a level of about 4 ft. above the spillway. The spray went high into the air. The bridge at the base of the dam looked serious and was not expected to hold. It did, though the east roadway was eroded completely away and the retaining wall 3′ thick collapsed for half the distance back to the dam.

At 6 p.m. (1800 hrs) W2PSH drove over to our side of the dam and looked the situation over. The water had dropped 3/4 inches in the last hour.

We went back to W2VKT and held a consultation as to the value of 3 stations holding down the job. All of us were cold, thirsty and hungry (especially #1 son who is always hungry) and after checking with zone, decided to make 3 shifts out of it. W2VKT took the 6-8 shift, W2PSH took the 8 to 10 shift and W2MCJ took the 10 to 12 shift.

We turned on the National at home to monitor the frequency and at around 9 p.m., the emergency was declared reduced and the mobiles were called home. We decided to go up anyway and used the searchlight on the generator with the HP binocs to examine the dam from our previous strategic spot. Finally it got too cold for the Water Shed guard who was with us, so we all went back to the road block and had coffee. Those boys had a rough deal. All night watch.

Well we didn't serve in a *real* emergency, thank goodness, but the potential was there and the hams would have been on the spot to serve it. If the dam had broken, the village of Croton would have been in the possible path of the water. Route 9, the Albany Post Road, would have been wiped out at Harmon and the Harmon Railroad yards would have been under water as well as the New York Central RR bridge being washed away, cutting New York City off from a good deal of its food supplies.

Sorry I didn't bring the camera.

Tommy, W2MCJ
Ossining, N.Y.

P.S. In that my father-in-law was the paymaster when that dam was built, I was reasonably certain that the dam would hold.

Dear Sir:

Re, "But You Can't Get It" by J. W. Campbell in the September issue, is an article which dwells on a very sore spot with me. I am an Amateur and have been since 1937. I am also a dyed-in-the-wool experimenter. While I enjoy my contacts on the air, it is usually more because I am trying out a newly designed or changed piece of equipment than because I just want to talk. In short I like to experiment and try new ideas or equipment or methods AND, after all, isn't this the way the amateur has grown to what he is today?

Let me give you an idea of what I have encountered in the last year or more in trying to use a new idea.

Having read an article in CQ about printed wiring I decided to try it. I wrote letters to six manufacturers and three large retail stores inquiring about the availability of the copper clad phenol. Two manufacturers answered me. One would not sell less than ten sheets. The other would sell one sheet—for the price that it would cost for ten! (plus a small handling fee). Ten sheets would print up 500 circuits like I wanted to do! After six months I found some surplus scraps and pieces, enough to do the job. In the meantime I have been trying to find out where to get the sockets. Two manufacturers out of many answered. One sent me the specs but said he was sorry but he could not supply small quantities. The other, Cinch-Jones, GAVE me some sockets. Note that none of the large retailers show these sockets in their catalogs to this date. The ink was easy to get at a photo engravers. I found 2 ounces of Ferric Chloride at a local drugstore and was able to print three small circuits. They worked so well that I was determined to print the entire circuit for my mobile converter. Dreamer! It is now one year later and I have not been able to get another ounce of Ferric Chloride! Even tried in that mecca of electronics, Los Angeles. The wholesale chemists wouldn't sell it to me and the drugstore has back ordered it for months. What to do?

Add to this: 8 pin miniature sockets for tubes like 6BF7 (sub-miniature), 3 gang tuning condensers for receivers of miniature type, various parts for printed wiring like i-f transformers and electrolytics, cases for equipment that have some style to them and not just ugly black square cornered boxes. The pages of the technical magazines shout about devices that would make any experimenter drool, but you can't get them.

There once was a time when any amateur who wrote to a manufacturer and asked about the equipment really received service, now they don't want to be bothered with us! Equipment advertised for sale in catalogs aimed at amateurs still has old out of date equipment that I used in 1937. There hasn't been a really good looking zero backlash dial offered in many a year. If you aren't a sheet metal man you wind up with equipment that looks home made and there is no excuse for it. Can't magazines like CQ do something?

It is no wonder that the amateur of today buys his receiver, transmitter, antenna, and accessories and sits down to talk! The experimenter is being pushed under the trampling feet of the commercial electronics industry. Once we showed them how it could be done but it is hard to do now, because if it is a part you need to do it,—YOU SURE CAN'T GET IT!

Wilbur G. Barrett, W0DTC/7
Yuma, Arizona

Your worries are over. In a month or two CQ will start a short series of articles on printed circuits which will give complete data on what to do, how to do it, and where to get the parts for doing it. Many experimenters have been stymied by the problems you encountered and the solutions will prove interesting. As a short hint: for fibre you might contact the National Vulcanized Fibre Co., Wilmington, Delaware, or Synthane Corporation, Oaks, Pennsylvania. Conventional tube sockets work very well if the circuit board is designed to accommodate them. Special snap-in miniature sockets are available from Cinch Manufacturing Corporation, Chicago, Illinois. . . . Ed.

Dear Mr. Green:

Winds and storms of recent days not only create new demands for emergency communications but also bring to mind an unusual occurrence of last year.

The time was 7:10 p.m. The date, Friday, October 15th, Hazel was relentlessly pushing northward. Amateurs in the New York-New England area were busily exchanging weather information when suddenly, the radiotelegraph letters S O S could be heard clearly and distinctly. Net operations came to an immediate halt.

The unknown and, as later events indicated, irresponsible and possibly unlicensed station continued:

SOS SOS W2ABC CRASH HURT 2 BROKEN LEGS CAR CRASH IN MEADOW CANT WALK PAIN IN FORT LEE N J

On acknowledgment by W1SS, W1ONZ, W2GFP, W2RSC and others, the following was added:

W2ABC ON FORT LEE ROAD AM IN ACCIDENT

Asked if there was anything further he wished to say, the sender replied:

W2ABC NO TKS IM DIZZY

Police in several states were given reports of the message. Men from a nearby New Jersey State Police substation could, on visiting the area described, find no trace of an accident, victim or damaged automobile.

W2ABC, the amateur whose call letters had been used, was safely at home in western New York and, at the time the event took place, had not even been on the air.

The disgust and annoyance of those concerned ran very high. One valuable lesson was learned however, and in the future, while full attention will be given to an distress call, its authenticity will be viewed with more than a trace of suspicion.

James R. Barrett, W2GFP
East Greenbush, N. Y.

. . . DE W2NSD

[*Continued from page 15*]

call *CQ* when a fellow walked up and whipped out a QSL card: W9OKB. Jim and I did a double-take for this was the fellow who had won the QSL contest for September! He had sent in his card from Arcadia, California, his home QTH was Chicago, and here he was on Mt. Washington! Ken was only up there for a few days working for the Air Force, but expected to be back for the entire month of November. He had a Communicator too and a six element beam. After commenting on the smallness of the world, etc., I talked Ken out of his beam for the afternoon and we propped it up on a broomstick in the rocks next to the Communicator.

The first QSO was with WN1EXH/MM in Gloucester Harbor who was running a Communicator on his boat. Signals loud and clear both ways. Later, as it became apparent that band conditions would keep us from getting back to the farm in Littleton, N.H. for a 5 PM dinner with my folks I contacted W1NF/M who was in a nearby town with a Communicator in his car and had Art call to say we would be late. What service! In all we worked 21 stations through Maine, New Hampshire and Massachusetts. I heard a couple of New York State stations but was unable to attract their attention. We finally quit around six, not wanting to try the dangerous road down the mountain after dark. That trip was certainly one of the high spots in my ham career (pun intended).

The Gonset Communicator has made quite an impact on the two meter band. They are everywhere. Being conditioned to the 522 at $25 to $50 I had a hard time psychologically wrestling with the $229.50 tag on the Communicator. After this one trip with it I was sold. The receiver is really *hot*. W2AZL tells me that it has a noise figure of about 6 db, which is good. It runs rings around the 522 for reception. The transmitter section of the Communicator puts out a good signal too. It is easy to tune, has provision to check your own frequency in the receiver by turning on the oscillator separately, has all the modulation you could ask for, and is really portable.

Jim and I were so impressed with the operation on Mt. Washington that we decided to have another summit try, this time in Vermont on Mt. Mansfield, the highest point in that state. We bought a 24 element beam and got a Gonset VHF Power Amplifier to up our power by a factor of ten for this trip. I also was waiting for delivery of my own Communicator so we had to borrow W2MHM's again. I forgave him for almost running over me with his seaplane a few days before while I was out water skiing.

A fellow on 75 told me that the mountain was near Rutland, Vermont so we headed for Rutland, intending to ask for final directions from there. In Rutland we found that we had 100 more miles to go, it was near Burlington instead. Grrr. On arriving we found that the road to the summit was much easier to navigate than the Mt. Washington road and we soon made the "top." The summit was in the middle of a thick cloud and all we could see were a couple of boarded up buildings and a trail going further upward. Up the trail we went looking for the TV station that was supposed to be on top, our source of power. The trail ended at a platform for sightseers, but above that was a wall of stone. It must be up there, so up we went scaling the steep stone face of the mountain. About fifteen minutes later we made the top, almost frozen. Top, schmop, where is the TV station? All we could find was a Pepsi bottle cap and a small stone marker. 400 miles for nothing? Ouch! We peered into the cloud in every direction and could see nothing.

Cold and disappointed we climbed back down to the platform and back to the boarded up hotel. There was another foot trail leaving there and going down the mountain so we decided to try it for a short distance and see if anything came of it. Naturally this led us to the road to the TV station and in a short while we had driven around to it and plugged into their power mains.

The car provided protection from the 33° cold on the mountain. We took turns going out to turn the beam, thawing out between trips.

Leo. I. Meyerson
W0GFQ

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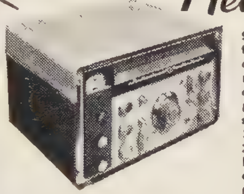

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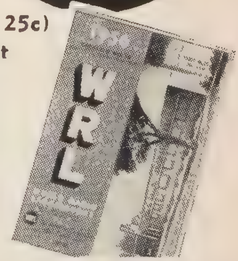

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On opening the beam package we found that no matching section had been included so we put 18 elements aside and set up one six element section on the top of our twenty foot portable mast. The Gonset Linear Amplifier loaded up fine right off the bat and apparently is almost foolproof for I followed the instructions and it came out OK. We got things all set in the car and settled down for some operating; I called a long CQ and stood by for a call, perhaps from Boston about 200 miles away. Crunch! One whole end of the band disappeared as W1MMV called me from the TV station about twenty feet away. He was using a Communicator and an experimental Quad antenna.

View of W2NSD/1 showing TV transmitting station in background. Mountain tops with TV stations on them are very handy since they make power borrowing possible.

A little later we settled down again and called another CQ and worked W1HUD, Sunapee, N.H., W1CLH, Newport, N.H., both about 90 miles away, followed by W1AHE and WN1FNQ in Massachusetts at about 180 miles. Next W2NIZ called from New York State. Turning the beam northward brought us VE2FF near Montreal, 90 miles away. Later we contacted W2SMB, W2ERX, KN2OIC (Schenectady) and W2WHX in Cohoes, all at respectable distances. The band conditions were very poor though and we made far fewer contacts than we had hoped. Guess we will stick to mountains further south from now on, like Sam does. Sam, confound him . . . on both weekends that we mountain topped he promised to be on and help us out. He never made it. He was sick over the Labor Day weekend and was without antennas during our second trip.

Long John Arrays

A few days ago I drove down to Asbury Park, New Jersey to visit the Telrex factory. Though they primarily manufacture television antennas they do have a wide range of amateur beams in production. I'd heard many times that Telrex beams were terrific, even from other beam manufacturers, but even with this preparation I was amazed to see the rugge construction of their beams.

Their lab is on a high hill overlooking th Atlantic . . . what a VHF DX location! Specifically I had made the trip to pick up one o their new 15 element in-line Yagi beams. Th monster was set up on top of the lab so w could try it out before packing it in my car We listened to a few signals with it, very impressive indeed. It had a tremendous forwar gain and almost nonexistent side lobes. The 2 foot long beam was split into two parts an stuffed into my station wagon. The two pole extended from the dashboard on out the bac door and the elements stuck out all over th place. It was like driving with a porcupin beside me.

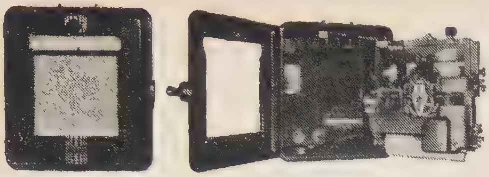
Mike, W2BDS, who owns Telrex, led m out to his home where he has one of thos $2000 Telrex 108′ rotating poles set up. A the time he *only* had a six element twenty mete beam on it. This is ham radio in a differen proportion than I have lived it. Inside was Collins KW-1 and 75A3. Mike put the rig o the air for a moment, said "Ahem," and gav his call letters. The band was immediatel loaded with DX stations calling him. Say, d you know anyone with an old used KW-1 the want to get rid of? But where would I eve be able to put a six element twenty meter beam

The 15 element two meter beam was a bi too big to hang on my poor little TV rotato so I used one of the Telrex three element beam for that and took the big one up to Sam WIFZJ, so he could put it up on his towe and check it out in comparison with his 12 element Collinear array. When I get somethin a bit larger rigged up here to rotate beams will get it back and use it myself.

The Ghost Band

Perhaps I am being a bit discouraging, bu a lot of other fellows have run into the sam problem that I have when they wanted to ge going on six meters. The first step is usuall to set up a converter for the band and the turn it on. OK, it is on, but where is it receiving? No signals! I used to be active on six few years back, but I finally got tired of th endless tuning of a blank band in the hope o an opening.

Recently W2HDM, W2ZGA, and K2KC got together and formed a company to mak six and two meter transmitters (and othe products later on). You will probably be hea ing more about their company, Harristal Laboratories, as they go into production. The first unit is a six meter transmitter which ru about twelve watts input. We'll run an artic on it soon so you can see what it is all abou Wanting some publicity for their brainchil they came over to my house one night with unit for me to set up and test. This prompte me to fire up the old six meter converter see what was doing on the band.



LEEDS & NORTHRUP MICROMAX RECORDERS

These are the strip type recorders used for controlling and recording a wide variety of processes. Used originally for temp. range of 350-550 degrees C. but may be changed for other applications. Operates on Wheatstone bridge principle using AC galvanometer movement. Original cost was several times our price. These units were removed from demilitarized equipment which in many cases was new; however, all instruments sold as used but guaranteed, or money back if not satisfied.

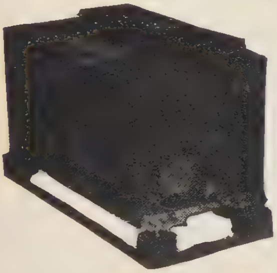
PRICE—$179.50

OAV-1 TEST SIGNAL GENERATOR—$19.50

This signal generator was used to provide a test signal of constant frequency for operation and alignment of IF amplifier stages in the CG-46ACQ type receivers. The generator covers the range between 150-250 megacycles. Amplitude modulated square wave output is obtained at frequencies of .1, 1, 10, and 100 Kc. depending on the position of the Freq. mod. Pulse switch. A 15 Mc. signal is also provided by a second osc. stage. Power is supplied by internal 115 V., 60 cycle AC supply connected to source by cord provided. Wgt. of unit 62 lbs.

BRAND NEW with instruction book. Price **$19.50 ea.**

BC-AS-230 TRANSMITTER—$3.95

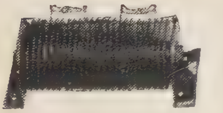


Brand new transmitters made to operate on 12 V. dc. Ideal for mobile use in new cars with 12 V. system. Contains four tubes with power output of approx. 25 watts. 0-1.5 amp. RF ammeter alone worth the price. Freq. range 195-13,975 kc. with full set of plug-in coils (one only picked at random packed with transmitter & included) Wt. approx. 13 lbs. Shock mt. included.

BRAND NEW Price

$3.95

RECTIFIER SPECIAL!!



24 V. DC 3 Amp. Selenium rectifiers—$1.50 ea. Just what you have been waiting for—A selenium rectifier to give you the dc source for operation of the many surplus items. Make up your power supply to deliver from 12 to 28 V. DC with these rectifiers and your AC source of from 18 to 36 volts. Parallel several for greater amperage cap. Measures 5¼″ L. x 1¾″ W. x 1⅞″ h.

Brand new .... ea. **$1.50**

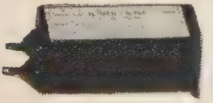
MINIATURE STORAGE BATTERIES

For pocket radio & Radio Controlled Models.

BB-51, 6 V. MINIATURE

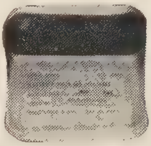
Consisting of 3 lead acid cells delivery 6 V. for 2.75 hrs. thru a 300 ohm resistance. Pin type terminals. Size overall 4-3/16″ x 1¼″ x 15/16″. Wgt. approx 5 ozs. New, dry-charge ....ea. **$1.75**

BB-52, 36 V. MINIATURE



Consisting of 18 lead acid cells delivering 36 Volt for 3 hr. thru a 1200 ohm resistance. Pin type terminals. Size overall 4⅛″ x 1-7/16″ x 15/16″. Wgt. approx. 5 ozs. New, dry-charge ....ea. **$1.95**

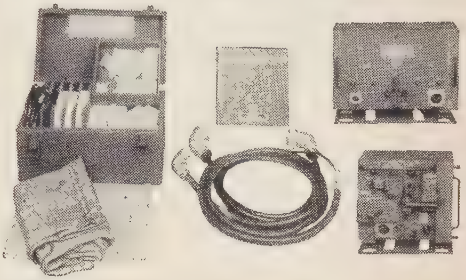
COMPLETE PACK BB-208



Includes three of the BB-52 and one of the BB-51 storage batteries above, all packed in vacuum sealed can.

Price, new, dry-charged **$6.00**

New FACSIMILE SET



Brand New RC-58-B facsimile set complete with BC-908-B amplifier & mounting. BC-918-B Recorder-Scanner with mounting, MC-308-B writing stand, spare parts chest, covers, and cords ready to operate on your 12 V. DC source. Wire or radio may be used as transmitting medium. Messages may be transmitted at the same time as one is being received. Ideal for ham, bank, or business use. Wt. packed 200 lbs. approx.

BRAND NEW orig. package **$95.00 ea.**

ELECTRIC STOVES — $9.50 ea.

Brand new surplus two-burner stove for use as is or inserting in cabinet top of your cabin or boat. 110 V. operated. Complete with off-low-med.-high Switch for each burner and cord and plug. Top of Black enamel steel 20⅜″ L. x 8″ W. with 1⅞″ deep lip. Bottom enclosure of metal 17⅝″ L. x 6″ W. x 9½″ deep. Features chrome burner rings and clean-out tray. These were made to insert in cabinet and are not to be confused with the cheap hotplate variety of stoves. We use one here for our office kitchen with excellent results.

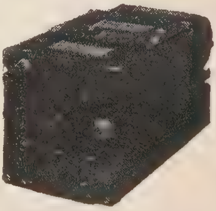
PRICE, NEW ....ea. **$9.50**

TU-7, TU-26, and TU-10-B Tuning Units

Used in the BC-375 transmitter, but the most favorable and acceptable piece of surplus gear for obtaining good cheap useable parts. The TU-10-B contains three double spaced transmitting type variable condensers of 16, 27 and 7 plate varieties, 3 mica transmitting type micas, 2 isolantite shaft couplings, antenna coupling switch, two precision vernier dials, chokes, inductances and other useful parts. Better order plenty before supply is exhausted again. TU-7, and TU-26 also in stock, same price. Ship wt. 13 lbs., size 7⅝″ x 16½″ x 7½″.

Used—$1.95 ea. **New—$2.50 ea.**

BC-455-B RECEIVER—$4.95



Ideal receiver for mobile or fixed operation. Excellent sensitivity and frequency stability are found in these receivers. New surplus release order—new supply will not last long at this price. Complete with tubes and guaranteed. Less dynamotor. For 6-9.1 mc operation.

New $6.95 **Used $4.95**

REMIT SHIPPING CHARGE AND INSTRUCTIONS WITH ALL ORDERS, OTHERWISE ORDER WILL BE SHIPPED EXPRESS COLLECT. ALL ITEMS GUARANTEED TO YOUR SATISFACTION OR MONEY REFUNDED IF RETURNED PREPAID WITHIN 10 DAYS OF RECEIPT. MINIMUM ORDER $5.00.

ESSE RADIO CO.

40 WEST SOUTH STREET
INDIANAPOLIS 25, IND.

I snapped a picture of Sam, W1FZJ, our VHF Editor one Sunday morning before he had shaved.

I plugged it in and the filaments burned just fine, but no signals! Maybe it wasn't working right. The grid dipper (Heath) put in a good signal, so did the Harristahl rig, and so did my 522 TVI bomb. But that was all I heard. Next I hooked in a cute little converter sent in by the Marshall Manufacturing Company (more on this in a future issue too) and heard the same nothing that my 6J6 converter provided. Ugh. Where are all those Technicians that are supposed to be setting up on six? Where are all the Gonset Communicators that are built for six? By next month I may have some answers to this, but right now I'd say that it was about time more of us buckled down and put a rig on six meters and got things humming there.

QSL's

The monthly QSL contest seems to be an unqualified success. Several hundred cards come in for the contest each month and the judges are hard put to render a decision. The cover last month gives you some sort of idea of the problem facing the judges. Actually this whole thing is a clever plan on my part to try to focus more attention on QSL's and get interest stirred up. I go for the motto, "The QSL is the final courtesy of a good contact." I believe that every amateur should swap a QSL with someone who is similarly interested. A card for every contact can soon run into big money if you are very active, but the least you can do is return a card when someone sends you one.

Cards do not have to be expensive. Some of the nicest I've seen were home printed by silk screen on the back of a 2¢ postcard. My card was drawn up by my mother and I sent the drawing to a nearby QSLery where a cut was made of it and it was printed for me quite reasonably.

Several of the editors of *CQ* have been pushing me for a *CQ* QSL which all of us could use. I haven't come up with anything good yet. How about you working out a design for us? Tell you what, the best design received before January first 1956 will win a prize . . . a Heathkit Grid Dip Meter or a VFO kit, whichever he wants. The card should be adaptable for all of the editors and should be kept down to two colors if possible. If a QSL printer comes up with the winning design he will be mentioned and given credit. Fair enough?

Special Deal

The subscription rate for *CQ* is going up from $3.00 per year to $4.00 per year with the start of the new year. Happy New Year. The last four issues of *CQ* should have given you the urge to keep the magazine coming. Golly, if this doesn't satisfy you then I give up. Thousands have written in to say that they approve of the changes in size, content, and makeup of *CQ*. The magazine is going to stay this size, and may even get bigger if we can get a few more pages of advertising to help pay for the deal.

Sam's XYL Helen, raising the 64 element beam while Sam shouts instructions.

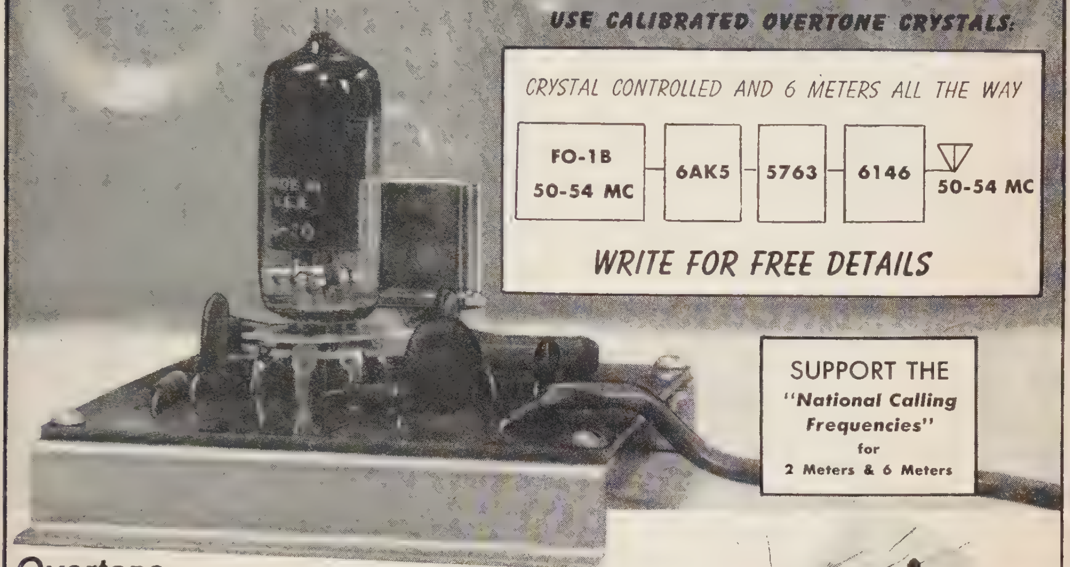
You can extend your present subscription at the old rate unless you'd rather wait and pay the higher rate. On the other hand you can pay the new higher rate right now if you want to and feel the pride of a man who has paid a premium for something. Think how proud you can be on the air being the first in your neighborhood to buy *CQ* at the new higher rate!

On the newsstands (if you can find it there) you pay $6.00 per year. By subscription you pay $4.00 per year ($3.00 until January) and get your copy early. Clubs get a special rate for six subscriptions at a time which works out to only ($2.00 per year until January) $3.00 per year. Send us a card or letter giving us the name and address of your club and its Secretary so we can send the special club rate information. We have some other plans for clubs afoot too so be sure to let us know about your club.

$1^3 + 2^3 \times 3^3$,
Wayne Green, W2NSD

FOR ACCURACY

KNOW YOUR OVERTONE FREQUENCY
USE CALIBRATED OVERTONE CRYSTALS.



CRYSTAL CONTROLLED AND 6 METERS ALL THE WAY

FO-1B 50-54 MC — 6AK5 — 5763 — 6146 — 50-54 MC

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SUPPORT THE
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2 Meters & 6 Meters

Overtone
PRINTED CIRCUIT OSCILLATORS

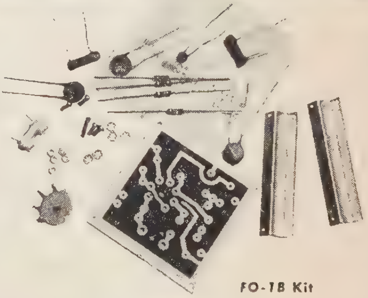
for Generating Spot Frequencies with GUARANTEED Tolerance from 15 MC to 60 MC

Since the operating tolerance of a crystal is greatly affected by the associated operating circuit, the use of the FO-1B Oscillator in conjunction with the FX-1 Crystal will guarantee close tolerance operation. Tolerances as close as .001 percent can be obtained.

FO-1B for Overtone Operation 15 MC to 60 MC

FO-1B—Oscillator Kit (less tube and crystal)	*$3.95**
FO-1BA—Oscillator, factory wired & tested with tube (less crystal)	*$6.95**

* Includes coil in one of five ranges: 15-20 MC, 20-30 MC, 30-40 MC, 40-50 MC, or 50-60 MC—Specify when ordering. Extra coils 35¢ each.

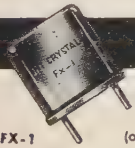


FO-1B Kit

OVERTONE OSCILLATOR SPECIFICATIONS—FO-1B

Freq. Range	15 MC-60 MC (in 5 ranges).	Maximum Drift with ±10% Plate Voltage change.	.0015%.
RF Output	2 to 7 volts into 18,000 ohms.	Maximum Drift 40 F. to 120 F.	±.002% including crystal.
Plate Power	150 volts @ 8 ma.	Calibration Tolerance	.001% to .01% depending on FX-1 Crystal used.
Heater Power	6.3 volts @ 175 ma.	Sixe	4"x4"x3" overall.
Tube	6AK5.	Mounting	4 holes (with brackets provided).

FX-1 CRYSTAL Companion to the FO-1 Series Oscillators



FX-1

The FX-1 Crystal is designed for use only with the FO-1 (or FO-1B) Oscillator. For tolerances of .01% and .005% any FX-1 Crystal can be used with any FO-1 Oscillator.

For tolerances closer than .005% the Oscillator and Crystal must be purchased together. The Oscillator is factory wired and the crystal custom callibrated for the specific oscillator.

For crystal prices consult table at right.

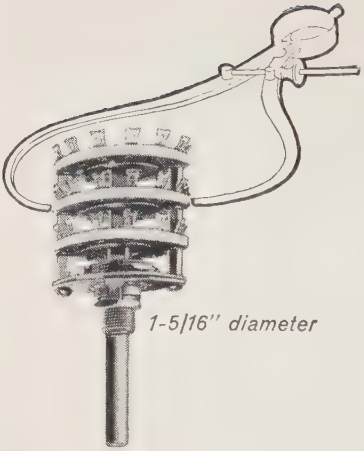
TOLERANCE	15 MC-29.9 MC	30 MC-60MC
.01%	$ 3.00	$ 4.00
.005%	$ 5.00	$ 6.50
(For .0025% and .001% tolerances see footnote)		
.0025%	$ 6.50*	$ 8.50*
.001%	$10.00*	$15.00*

*** Prices are for crystal only. To insure tolerances closer than .005% crystal must be purchased with oscillator factory wired and tested. For total price add $6.95 to price of crystal desired.**

HOW TO ORDER: In order to give the fastest possible service, crystals and oscillators are sold direct. Where cash accompanies the order International will prepay the postage; otherwise, shipment will be made C. O. D.

International CRYSTAL Mfg. Co., Inc.

18 N. Lee Phone FO 5-1165
OKLAHOMA CITY, OKLA.



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the tight spots!

Centralab Miniature Switches

They're small in size — big in performance. They have the same 6-watt rating as larger Centralab rotary selector switches.

And they provide other advantages:

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Both phenolic- and steatite-insulated miniatures are available — in deluxe, military quality. Index assemblies and hardware for both types are interchangeable.

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P-3155

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BINDERS **Binders** BINDERS

BINDERS BINDERS BINDERS BINDERS BINDERS BINDERS BINDERS BINDERS BINDERS

There isn't a ham going that doesn't have the same problem I had keeping back issues of magazines. Oh, it's all right for the first year or so, but after a while they begin to pile up on bookshelves, boxes, upstairs, in the cellar, all over the place. You try to stack them on end so you can pull out any issue you want and they sag into a permanently rounded heap. You pile them flat on a shelf and they dump in your lap when you try to pull a bottom issue out.

But all is not hopeless . . . chin up and stout heart . . . **CQ** to the rescue, and all that. Binders! (surprised?) Yes, binders are the simple solution to this mish-mash. Luckily we have had the foresight to lay in a supply of these binders which we reluctantly sell to you at a markup which makes our bookkeeper groan with dismay. The whole thing is mostly a service (Edison Award Committee please note).

The binders are sturdy and attractive, with the year marked on the edge. Please tell us what year binder you want when you order. You can put your **CQ**'s in the binder in minutes and though they can't fall out of their own accord you can remove one quickly and easily if you have to have it. Special hinged covers allow the binder to open flat. The cost of the binders is only $3.50 each. We wish there were some way to provide a binder that would be satisfactory at a lower price, but we won't sell something unless it is good and this is the price you have to pay for something good.

—W2NSD—

BINDERS BINDERS BINDERS BINDERS

CQ Magazine
67 W. 44 St.,
New York 36, N. Y.

Enclosed $.................. For.................. Binders

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ADDRESS..................................

CITY.................. ZONE.......... STATE..........

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SAVE
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SYNCHROS

NEW NAVY TYPE SYNCHROS

SURPLUS
SAVE
SURPLUS

Also known under trade names such as Selsyn, Autosyn, Etc.

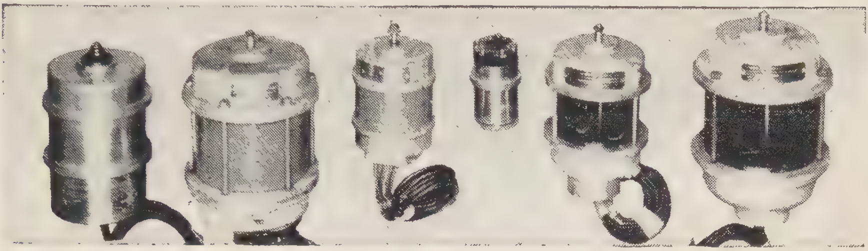


TABLE OF TYPES AND PRICES—All 110 V. 60 Cycle Units

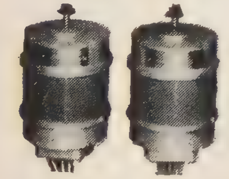
Size & Type	Approx. Wgt. (lbs.)	Approx. length (inches)	Approx. dia. (inches)	Price New
1G	2	3.9	2.2	$10.00
1DG	2	3.9	2.2	10.00
5F	5	6.0-6.8	3.4-3.6	15.00
5G	5	6.0-6.8	3.4-3.6	15.00
5DG	5	6.0-6.8	3.4-3.6	15.00
5D	5	6.0-6.8	3.4-3.6	15.00
5CT	5	6.0-6.8	3.4-3.6	15.00
6F	8	6.4-7.5	4.5	20.00
6G	8	6.4-7.5	4.5	20.00
6DG	8	6.4-7.5	4.5	20.00
6CT	8	6.4-7.5	4.5	20.00
7F	18	8.9-9.2	5.8	25.00
7G	18	8.9-9.2	5.8	25.00
7DG	18	8.9-9.2	5.8	25.00
110 V. 400 Cycle Units				
5F	5	6.0-6.8	3.4-3.6	9.50
5G	5	6.0-6.8	3.4-3.6	9.50
5DG	5	6.0-6.8	3.4-3.6	9.50

G-Generator: F-Motor (Follower): DG-Differential generator:
D-Differential Motor: CT-Control Transformer

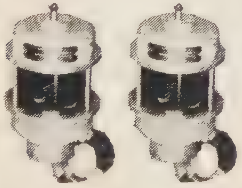
The function of the synchro is to impart accurately motion from one shaft to another shaft where direct connection is not feasible either because of distance or because of need for torque amplification. Synchros are used extensively for remote-indicating and data-transmission, such as compass repeaters and other systems, and are combined with servomechanisms for hundreds of uses such as aiming guns, pointing searchlights, automatic steering, remote control, etc.

BARGAIN SPECIALS!! — FOR the AMATEUR, HOBBYIST & EXPERIMENTER

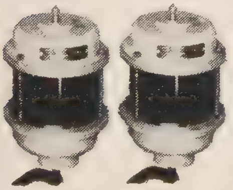
Below are listed synchros removed from equipment and sold as used to provide you added savings.



Size 5 motor & generator combination suitable for TV beam, indicator and other light applications ... set **$17.50**

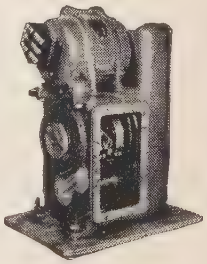


Size 6 generator & motor for medium size beams and greater torques. set **$25.00**



Size 7 generator & motor combination which is suitable for all but the heaviest beams and can be used with suitable gear ratios for these. Provides the maximum of torque ... . set **$35.00**

TORQUE AMPLIFIER — NEW — $9.75



Ideal unit for use with synchros size 5-6-7. To provide torque amplification and allow ease in rotation of input shaft. (Works similar to power steering). Small amount of rotating power applied to input shaft is reproduced in any direction on the output shaft, the torque being supplied entirely by a 1/40 HP 110 V. AC motor through a gear and planetary drive hookup. Speed varies directly with rotation of input shaft with no noticeable loss of accuracy. Motor requires capacitor of 85-120 mfd. for starting. These units originally used on gun control device and cost the Gvnmt. hundreds of dollars to mfg. Unit fully enclosed in cast aluminum case, size all 12″ h. x 5⅜″ w. x 7½″ d. Wgt. 23 lbs. Packed in original wood box, total shipping wght. 45 lbs.
Brand New **$9.75**

Starting capacitor for above Torque Amplifier, New **$1.00**

TERMS: CASH WITH ORDER EXCEPT RATED CONCERNS. ALL MERCHANDISE GUARANTEED TO YOUR SATISFACTION OR MONEY REFUNDED IF RETURNED WITHIN 10 DAYS. PLEASE INCLUDE SHIPPING CHARGE: OTHERWISE ORDER WILL BE SHIPPED EXPRESS OR FREIGHT COLLECT.

SYNCHROS DIV.

ESSE RADIO CO. **40 W. South St.** **Indianapolis 25, Indiana**

VHF

[from page 81]

Hillsdale, Michigan Ken Huggett (W8SSZ) has the following suggestion to make:

> "I have a suggestion which I would like to pass on to the VHF gang for their consideration: Quite a few of us like to have a two-meter mobile rig in our cars, using a converter into the automobile BC receiver. With some, if not most, converters with this IF, two crystals are required to tune the two-meter band generally in use. This requires re-peaking the converter for maximum results. Now, I wonder if the gang would go for a "standard" two-meter mobile calling/listening frequency, so that the two-meter mobilers would have a reasonable expectation of a 'listening public' while on the move in their cars? I feel certain that both the touring mobiler and the fixed station would get some satisfaction in making contacts. (If I were touring in California, I might get A W6 contact again, just as I did last winter when a W6 was visiting near here. We made contact only after he came to see me and asked be to look fo him on his crystal frequency.)
>
> "Possibly this suggestion has previously re ceived consideration, but escaped my attention If you think it is worth while, I would like t have you mention it." *We surely do think it' a good idea, Ken, now the thing to do is t somehow manage a frequency that is agreeabl to all.*

Chardon, Ohio From WN8SVQ, Hal Novak we have received lots of information concerning the gang from our old stamping grounds.

> "We have finally gotten a two-meter ne going out here in West Geauga County. Th only difficulty so far is that we have no on interested in VHF East of Route 44. *There use to be several of them Hal, east of Burton. We' have to look up their calls again.*
>
> "Lloyd Frohring, W8PMJ, is control office and is doing a nice job. Net meets every Monda night at 2030 on the air (EST) and ragchew may last until the wee hours. Most of us ar on the air every night at some time or other Net frequency is 145.5, give or take a few kc's

[*Continued on page 108*]

IT'S V & H FOR VERY HOT BUYS IN ELECTRONICS

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7.5 A. MAXIMUM 0-130 V.A.C. 60 cyc. OUTPUT Excellent cond. With pointer knob and scale. $12.50

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Input 115 V. AC, 50/60 cycles. Output voltage 0-135 volts AC. Maximum amps output, 15 amps. 2 KVA. Overall size 8-3/16" x 8-1/16". Complete with knob and scale. Send 30% deposit with order. Open accounts to rated firms. $33.95

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Pri. 115 V, 60 cyc. Sec. 950 VCT @ 100 MA.; 5 V. @ 3 A.; 6.3 VCT @ 4 A. New $2.95

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ALL 2" CR TUBES—902P1, 2AP1, etc. Ea. $3.50
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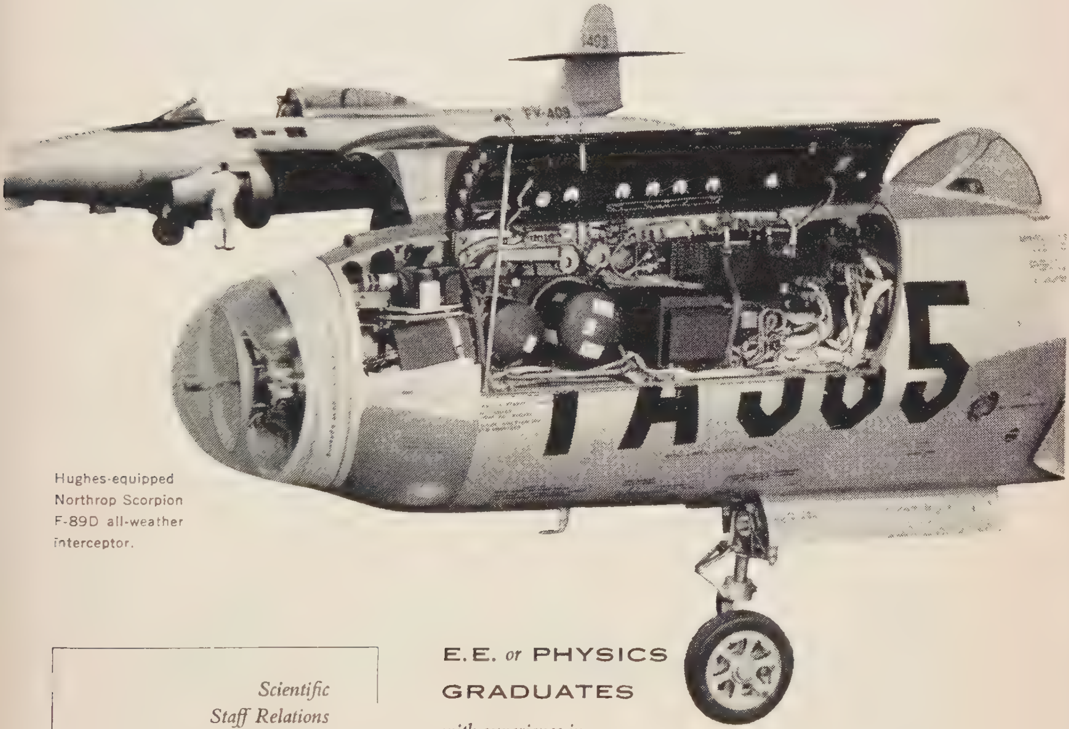

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NEW BUD 2-Tube Frequency Calibrator

FCC-90A

The elimination of drift is a vital responsibility of every amateur operator. To comply with Federal Regulations some means of accurately checking transmitter frequency must be available at every "Ham" station. You can avoid a "pink ticket" for off-frequency operation by using the BUD self-powered frequency calibrator. The new, improved BUD FCC-90A uses 2 tubes—50C5 and 35W4. It consists of a 100 kc crystal oscillator that is completely self-powered and will give 100 kc check points on all bands to 30 megacycles. This enables you to determine the exact band edges.

No extra wiring is required to install this unit. Plug the FCC-90A into a 110-volt receptacle, connect the pick-up lead to the antenna binding post of the receiver and the unit is ready for operation. An ON-OFF switch and a STANDBY switch are provided.

FCC-90A........................Amateur Net **$17.25**

BUD RADIO, INC.

2118 East 55th Street **Cleveland 3, Ohio**

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50c per copy

CQ Magazine

67 West 44 St. **New York 36, N. Y.**

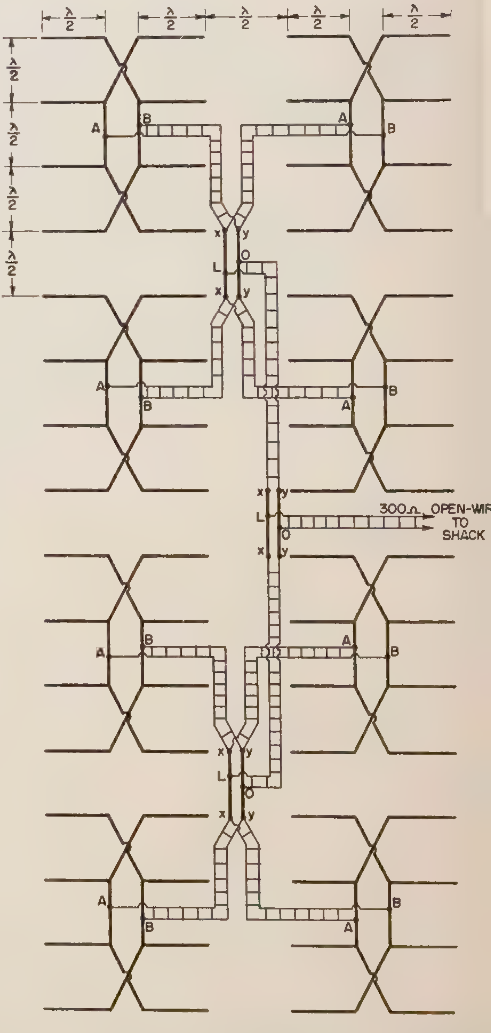
[from page 106]

what with the seventy-nine cent crystals we a using. The club has 'made' a few more novice most of the credit for this going to V.P., Mekke who devoted a good many hours to teachi both c.w. and theory to them.

One of the new ones, Dr. Ted Maves, WN FFA, is on the net with a Harvey-Wells. He near Chagrin Falls. Using an RME into a SX28 for listening. Mekker, W8NAK, Newbu is using a new Gonset 'Green-eyed' monster. new member, Ralph Burhans, W8FKC, ne

[Letters continued on page 110]

NOTE:
1. ALL PHASING LINES ARE OPEN WIRE OF ANY REASONABLE IMPEDANCE. LINES Ax / By ARE 1/λ ELECTRICALLY. LINES Lx / Oy ARE 2/λ ELECTRICALLY.
2. MATCHING SECTIONS xx / yy ARE HALF WAVELENGTH LONG, 1/2 DIA TUBING. SPACING IS ADJUSTED TO MATCH 300 Ω OPEN WIRE LINE AT L/O.



Many have asked for the feed data on W1FZJ's n 128-element beam. H'yar 'tis.

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PHILCO TECHREP DIVISION

22nd & Lehigh Avenue, Philadelphia 32, Pa.

[*from page 108*]

Bainbridge is on with a 'home-brew' outfit running about thirty-five watts with a pair of 6360's. (He also has equipment for use up through 1215 Mc.) Mekker and I are also going on two-twenty and four thirty-two soon as we can whip up some rigs for it.

"In Chardon, I am running that 6J6 rig I built, about six watts out, into a double V TV (naughty word) antenna, twenty feet up and rotated by a seventy-five-mm gun crank through the shack wall. Hi! Tecraft into an NC-98. Going to build up a stronger final and two five-element Yagis about ten feet higher. Bob Ball, W8OLH, near Geauga Lake has a transmitter for two and will be on as soon as he gets a converter going. Dick Barker, W8WFF, near Chester is also going on soon, has rig built and uses a TR-4 for receiving. Julius Szabo, WN8-UBE, Kiwanis Lake is converting a 522.

"In the near future we plan on using part of our net time for MCW or CW., so that we WN's can up our code speed. I hope to be able to get mine up by December so I can take the exam for the General ticket." *First news we've had from the old gang, Hal, keep it coming, sounds very good.*

Willowdale, Ontario, Canada Robert W. Weir, (VE3DWW) has sent us the following letter which has perked up our spirits considerably:

"Thought you might be interested in the fact that you have been responsible for the additio of another subscription to CQ magazine.

"Congratulations—the 'new look' has hit C —in the VHF department particularly. W2NS is certainly doing a job in smartening up th rest of it.

"It was my privilege to hear your remarks a Oakville, Ontario, following the September VH contest. The turnout surprised me to the exten that there is now another voice on two-meter (*this we love to hear*) in these parts runnin fourteen watts input to a 522 transmitter whic has been extensively reworked to improve output and quality. We get eight watts out a fourteen watts input. The antenna is a six element 'Sinclair VHF communications' Yag 9.5 db forward gain and 12 db front-to-bac ratio. (They claim.) Receiving is taken care o by a crystal-controlled converter working into BC-48Q. at fifteen Megs.

"Two meters is a terrific band. It's friendl and a real pleasure to work." *One of the mai reasons we like it too, Bob, never hear tha "picking at the other guy" on the VHF band* "Signals seem to drop in out of nowhere withou QRM or noise other than the noise generate by the receiver. As a matter of fact it seems tha the quality and reception is far superior t Mother Bell's land lines." *Looks like we hav the makings of another good VHF man her boys, he's really enthusiastic.*

GEAR DOLLARS GO FURTHER with the

TURNER CHIEF

Designed for amateurs, the Turner Chief meets your need for a quality mike at low cost. The Chief is compact and convenient on desk or stand or held in the hand. Model 808 has moisture sealed crystal; Response: 60-7,000 c.p.s.; Level: —49 db. *Model 809* has magnetic interior, for ruggedness, good performance, resistance to high humidity and heat. Response: 100-8,000 c.p.s.; Level: —52 db. For heat and humidity resistance at still lower cost, specify ceramic *Model 807;* Response: 80-7,000 c.p.s.; Level: —57 db. All except switch models are insulated for AC-DC circuits.

Model 808 Crystal & Model 807 Ceramic. List Price $10.85

Model S-808 Crystal & Model S-807 Ceramic (with on-off slide switch) .... *List Price $12.85*

Model 809 Magnetic........ *List Price $14.95*

Model S-809 (with on-off slide switch)....*List Price $16.95*

Mail this coupon for full information

TURNER

THE TURNER COMPANY
925 17th Street, N.E.,
Cedar Rapids, Iowa

Gentlemen: I would like more information on the Turner Chief.

Name ....

Address........

City ....Zone ...... State

Elizabethtown, Kentucky Shelby Ennis, (W4WNH) one of the regulars says:

"We had a pretty good opening October 1st and 2nd to the southwest; and another opening on October 9th, 10th and 11th to the northeast. I was hoping to hear you, but ND. I did get two new states, though, Pennsylvania and New York. Also got VE3. W4HJQ got these and West Virginia too. Pretty good, as Tom can't transmit CW with his rig. He often works phone to CW, though.

There is supposed to be another meteor shower during the period of October 12-23. If you, or anyone else, want to try for Kentucky, I'm willing. Of course, I don't run QUITE a kw; but when W2ORI gives me the same report I give him, I feel pretty good." *Know what you mean Shelby.* "Another regular shower on December 10-13, too. Of course, there are other meteor showers besides the Orionids and Geminids (and the Leonids on November 14-18, which I forgot), but they aren't as regular in appearance." *This is the second letter this month concerning the meteor showers and we're glad to see that another thing is being studied and included in "ham radio".*

DX

[from page 75]

KC6CG	USCG LORSTA, CG Depot, Box 3, Navy 926, FPO, San Francisco, Calif.
ex-KJ6BG	1109 Monroe St., Pasadena, Texas.
PZ1BS	An Soeperman, Box 848, Paramaibo, Suriname.
PZ1CD	Box 848, Paramaibo, Suriname.
SU1IC (Correction)	Ibrahim M. Charmy, 1, Mohamet Pasha Shukri Str, Agoza, Giza, Egypt.
VP8BC	Box 177, Port Stanley, Falkland Islands.
VU2SX	St. Xavier's College, Technical Institute, Bombay, India.
W5 QSL Bureau	Bob Roden, W5UXY, 5929 Bertha Lane, Ft. Worth 11, Texas.
W5SOF	ex-KA7AR/CN8GU/W4FFR/VO6. 4411 Alice Ave., Austin, Texas.
XZ2SS	"San" c/o Electriciay Supply Board, Rangoon, Burma.
YA1AM	Via ARRL or RSGB.
ZC4JA	23 Orpheus St., Nicosia, Cyprus.
5A1TL	Via K2MSG, Box 61, Maybrook, N.Y.

Thanks to the West Gulf Bulletin, North California DX-er, DL4ZC, W4CEN, W5FXN, W3AXT.

Best wishes to all for a happy Xmas season, with DX - - - KV4AA

Here is a "Radioddode" from G3JHH with a moral!

When one's feeling somewhat vocal,
And would talk to stations local,
'Tis better far to use one watt
Than all the watts wot one has got!

RADIO AMATEURS' BYWORD!

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Radio Amateurs know their most dependable source for components is AMPHENOL. RF connectors, cable, sockets, plugs, jacks—thousands of electronic parts are instantly available at AMPHENOL Distributors. Radio Amateurs know, too, that they can depend upon AMPHENOL quality as well as availability—each component precision engineered and manufactured to the highest quality standards in the industry. No wonder AMPHENOL is a byword to Radio Amateurs!

6 METER CONVERTER

- **Small Size!**
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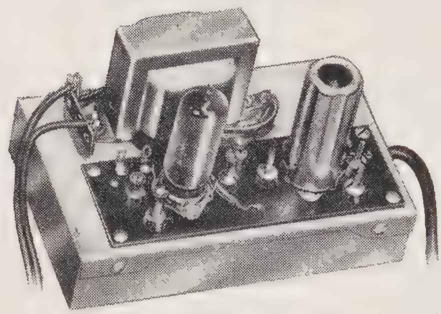

Has all the important features of comparable units costing up to three times as much!

Now you can receive 6 meters on conventional short wave receiver! Specially designed push-pull 6J6 R.F. amplifier into 6J6 oscillator-mixer. Balanced line input, coaxial output. All slug-tuned adjustments. Output frequency is 21-25 MC. Extremely stable oscillator. Only 5" long by 3¼" wide by 3½" deep. Complete with AC power supply and tubes. Amateur net **$27.95**

2 METER CONVERTER

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MODEL 1A: Without AC power supply........ $16.95
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—W2NSD

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PROPAGATION

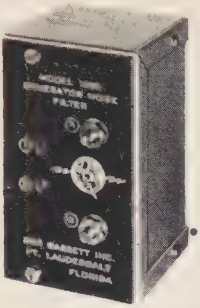
[from page 54]

throughout the world vary considerably w geographical area, being highest in the equ torial regions and lowest in the polar regio Static levels also vary seasonally, being high during the summer months and lowest duri the winter months. It is the difference in atm pheric noise levels that may exist at each e of a circuit that usually accounts for what m at times appear to be a contradiction of t natural law of reciprocity. Going back to c example of the Washington, D.C. to Buen Aires circuit; during December at 1600 ES the atmospheric noise level on 20 meters South America, including Buenos Aires is a proximately 13 db higher than those througho most of the USA. If the signal delivered fro Buenos Aires to Washington is received j above the noise level, the same signal streng received in Buenos Aires from Washington w be 13 db *below* the noise level. The Buen Aires signal would therefore be heard in Wa ington but the Washington signal would not heard in Buenos Aires, regardless of the f that both signals are of equal signal intensi because the signal would be lost in the hi noise level. So while the laws of reciprocity a valid for signal intensities, they do not nec sarily hold for signal to noise ratios. The diff ences in noise intensities that may exist at ea end of a circuit, usually accounts for m cases of "one way skip".

"One way skip", especially during unsta ionospheric periods, can also occasionally caused by *scattering* from "rough" areas in t layers of the ionosphere. Reflection from t ionosphere is not altogether like a reflecti from a perfectly smoothed surface since t layers of the ionosphere are subject to so amount of turbulence, which increases cons erably during ionospheric disturbances or oth unstable periods. This turbulence can produ areas of rough irregularities in the ionosphe These irregularities sometimes produce a in the horizontal surfaces of the ionosphe causing a radio wave to be scattered in ma directions rather than being normally reflec in a forward direction along the great cir path. Additionally, because of the tilt of t horizontal reflecting surfaces, the signal arrivi from one direction may strike the reflecti surface at a different angle than will a sig arriving from a reciprocal direction. This resu in different reflecting characteristics and sc tered signals of this nature do not usually ob the laws of reciprocity and may result in "c way skip". In a similar manner signals m scatter from intense sporadic-E clouds or fr aurora displays. "One way skip" due to scatt ing can usually be detected by weak sign and a characteristic fluttery or warbly fa associated with scattered signals. Scattered s

[Continued on page 114]

Mobile Noise Filters . . . .



Generator Noise Filter Completely shielded generator filter designed to reduce the "whine" and hash of generator commutation. Model 1080 for 10-11-15-20-40. Model 1080A for 2-6-10-11.

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35 Crystals $3.49

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For operating on 80, 40, 20, 15, 10 6 and 2 meters—on either fundamentals or harmonics.

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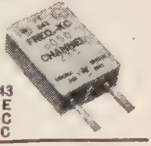
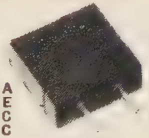
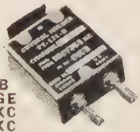


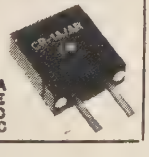
FT-243 RANGE 1015 KC -8733 KC



FT-241A RANGE 370 KC -538 KC



FT-171B RANGE 2030 KC -3995 KC



CR-1A RANGE 5910 KC -7930 KC

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377	398	420	490	512	536
379	401	422	491	513	537
380	402	423	492	514	538
381	403	424	493	515	
383	404	425	494	516	
384	405	426	495	518	
385	406	427	496	519	
386	407	431	497	520	
387	408	433	498	522	
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1015	6100	6540	7150	8173	8550
3655	6106	6550	7250	8175	8558
	6125	6573	7300	8200	8566
3735	6140	6575	7306	8225	8575
3800	6150	6600	7325		8583
3885	6173	6606	7340	8350	8600
3940	6175	6625	7350		8625
3990	6185	6640	7375	8375	8650
6000	6200	6650	7425	8380	8680
6006	6440	7000	7440	8383	8700
6025	6450	7025	8000	8400	8733
6040	6473	7050	8025	8425	
6042	6475	7075	8050	8450	
6050	6500	7100	8100	8475	
6073	6506	7125	8125	8500	
6075	6525	7140	8150	8525	

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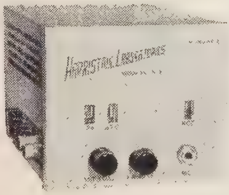

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[*from page 112*]

nals also generally arrive from directions that seem to bear little relationship to the actual direction of the transmitting station.

"One way skip" is therefore usually attributed to the geographical variation in atmospheric noise levels or to scattering from irregular surfaces in the ionosphere.

Propagation Broadcasts

National Bureau Of Standards radio station WWV (Beltsville, Maryland) broadcasts latest propagation information at 19½ and 49½ minutes past each hour throughout the day. WWV transmits simultaneously on 2.5, 5, 10, 15, 20 and 25 Mc. These forecasts are prepared four times daily and consist of (1) Description of propagation conditions for North Atlantic circuits at time of issue—"N"—normal, "U"—unsettled, or "W"—disturbed; and (2) Forecast for average quality of conditions for the next several hours with a rating of 1 being useless; 2—very poor; 3—poor; 4—poor to fair; 5—fair; 6—fair to good; 7—good; 8—very good; 9—excellent. Similar reports for North Pacific circuits are broadcast over National Bureau Of Standards radio station WWVH, located at Maui, Hawaii. Reports are transmitted in International Morse Code at 9 and 39 minutes after each hour on 5, 10 and 15 Mc.

Season's Greetings

During this past year I have received several hundred letters from readers of this column. This is by far the greatest interest shown in this column during the five years that it has appeared in *CQ* Magazine. Each letter received is answered by mail as soon as possible. If you have any comments, suggestions or questions concerning this column, or the field of ionospheric propagation in general, feel free to write to the author. When sending in questions please enclose a stamped addressed envelope and allow at least two weeks for a reply. Those questions that are of a general interest will be selected for discussion in the column.

Season's Greetings and best wishes to all in 1956. We can look towards the New Year with considerable optimism as the sunspot numbers increase at a rapid pace and DX conditions improve accordingly.

New Ham Bulletin

Don't you just love to get things in the mail? A Ham Bulletin that's growing in popularity is now available for the asking from a Florida outfit that's doing the same (growing, not asking). The one we have in hand has W4-land ham news, listings of used transmitting and receiving equipment for sale, and comprehensive New Equipment reports. Furnished gratis to interested amateurs, or for 1¢ per year to those who are suspicious of anything free. Write to Electronic Supply Dept. C, 61 N. E. 9th St., Miami 32, Florida.

TV TOWER ANTENNA

[from page 21]

or more. Number 18 or larger iron or copper wire can be used and buried just beneath the sod level. It is only necessary to open the sod using a sharp spade, lay the wire in the opening so provided and re-tamp the sod in place. It is imperative to note that the effectiveness of such a ground system will only be realized if the radials are returned to the tower base and grounded to a common ground stake connection driven far enough below the surface to provide a low resistance ground. This was done by using a circular copper band made of several wraps of bare wire around the antenna base providing an easy method of terminating the incoming radials to one common ground connection point. Further assurance of a good ground was obtained by driving long ground rods at intervals along the radials and making low resistance connections at each point.

A word about lightning protection: It is reasonable to assume that in event of a direct hit, it would be improbable the lightning would follow a right angle bend and enter the building at the far end of the co-ax. Further it is prob-

---

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The Hammond Company, world-famous makers of classroom maps, globes (see page 63), and atlases, have permitted us to make this NEW 416 page atlas available to *CQ* readers, together with one year of *CQ* magazine, for the regular atlas price of $12.50—already a bargain, as you know if you've priced similar atlases. Grab your magnifying glass and take a look at our ridiculously small facsimile of this tome, whose actual measurements are 14⅝ x 10¾″. In case you can't make it out, the lines at the bottom say:

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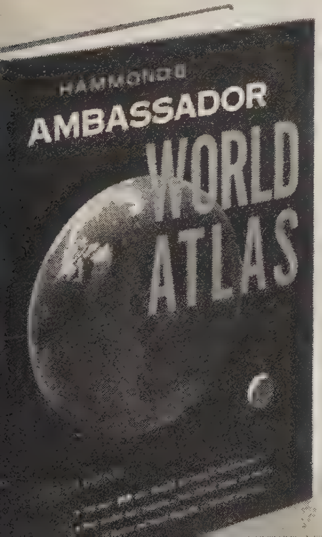
This is the atlas recommended by famous DXer VK3BG in his article "Enjoying DX," in this issue.

In the words of the Bard, "Make this a Merry *CQ* World Globe or Ambassador World Atlas or both Christmas!"



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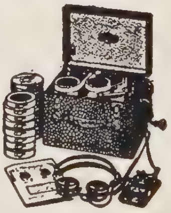

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able that the co-ax will tend to bleed off lesse charges similar to the action of the ordinar arrester. Therefore provisions for additiona protection seem unnecessary.

Results

This antenna has been in use for over si months with very good results. It has bee worked on all amateur bands from 1.8 to 3 mc and, as mentioned before, optimum performance was expected on the 7 mc band. DX and local station reports indicate the results t be outstanding on this band with reports ranging plus 20 and plus 40 db consistently. Likewise reports on 75 have been above those experienced with any flat-top used before. Operation on 14 and 30 mc produced average report but not outstanding due to a high vertical lob being produced because of the radiator bein over .6 wavelength at these frequencies.

We are not claiming this antenna to be cure to all problems heretofore encountere with other systems. However, our experienc concludes that so far as all-band antennas, thi one will prove its worth and justify the effor in construction.

NOVICE

[*from page 94*]

> I now have a brand new *NC183-D* and *Viking II, Heath VF-1* and an assortment o antennas. WN5KGJ, Billy Priakos lives righ across the street from me and we have a direc telephone line so when Billy hears some goo DX he calls me and when I hear best I cal him, that way we can operate as a team. H has 41 states and his best DX is ZL1IB o 40 CW. I am NCS on the *Ozark Net.* I woul suggest that the new novice build the *"Bakin Pan Wavemeter"* in (pardon my saying) th *February 1955 QST page 32,* to check fo spurious radiation and harmonics from hi transmitter. Well, I will sign off and say 73 Bob.

Woodcliff, New Jersey sends Lee Underkofler, KN2PHP of 261 Rose Avenue as it contribution this month. He says:

> "Dear Walt: I have had my ticket about month and a half and have found ham radi to be lots of fun. I moved from Ames, Iowa i April and got my ticket in July. The rig here is a *Viking Adventurer* running 50 watts o 80, 40 and 15. Receivers are an *NC-200 S38* and a *BC-455-B.* I would like to sked some KN6s, WN7s, KN9s and WN0s on 1 meters, my frequency is 21.132. I will als sked anyone needing New Jersey for WAS 73, Lee.

Finally a letter arrived from South Dakota from the second YL to write. Bette Lawle KN0BMS, Box 162, Winner, South Dakot writes:

> The OM- KN0BMM and I have been o

[*Continued on page 118*]

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B....Buy
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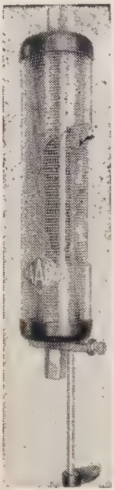

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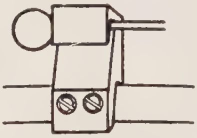

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[*from page 116*]

the air since June, mostly on 40 meters. We use a *Heathkit AT-1* transmitter and an *SX-96* receiver. The OM has 35 states and a VE5, I have worked 32 states, a VE4 and a VE5. From all reports we're a rather hard state to work so we will be glad to make a sked with any one needing a South Dakota QSO. We enjoy ham radio very much and are looking forward to some good DX on 15 meters. 73, Bette.

The first YL to write me a letter sends some good advice, she is Louise Moreau, W3WRE, 639 Russell Avenue, Johnstown, Pennsylvania.

"Dear Walt: I've got two suggestions for you to use. First, tell your novices not to sit on their own frequency after calling CQ but to tune either side of their calling frequency because quite often they lose a darn good contact that way. Or so I found during my novice career. If they have trouble because they can't work the guy and hear their own note, refer them to the oscillators in your column (October CQ) or to the *"Monitone"* from the *ARRL Handbook.* It is one piece of equipment that in my mind can't be beat for fast break-in in contests like SS when the competition is rough and a couple of seconds can mean everything. Secondly, Please tell them they can get as many QSOs by calling CQ in the tried and true 3X3 way as they can by calling the new 30 by 30 way. Frankly I've worked a good many far weaker contacts mainly because I just plain got bored waiting for the fellow to stop calling and sign. That is my only complaint, that interminable CQ business. Personally I find that the Novice Shack is still my favorite column and from all indications will continue to be. Thanks so much for those oscillator circuits. They are going to be a great help both in passing along to my friends who are in the novice-to-be-class, novice-aspiring-to-be-general class and to myself who needs one badly (the OM is always using ours just about the time I decide I need a little "fist practice"). So keep up the good work and I think you can safely remove W8ZCV from the help wanted list. He's doing a swell job. 73, Louise."

Jim Lancaster, WN8BVF, 5770 Reigart Road, Hamilton, Ohio, writes:

"Dear Walt: I've been reading the Novice Shack for about a year and a half. I like the pictures of the other fellows rigs very much. I also like the construction articles you have printed, I'd like to see you print one about a 15-meter preselector. *(Editors note: I'll try to fix you up next month, Jim)* I've been a novice now for about five months. I've worked 48 states, 47 confirmed, need Delaware yet. I would like to make a sked with Delaware to finish my WAS. I worked WN3BFG/3 in

[*Continued on page 120*]

When the gun failed, they used a tablespoon

HE LEARNED acting the hard way, barnstorming frontier towns (Chicago, pop. 2,000), traveling by barge and stagecoach, playing in sheds, courthouses, taverns.

One night in Houston, a Texan even suggested the troupe tour through Indian country, carrying their stage weapons for protection. Joe Jefferson declined. He later said he had shivered when he imagined himself facing a hostile Indian and armed only with a stage pistol whose tendency to misfire had several times "compelled our heavy villain to commit suicide with a tablespoon."

By the 1860's, Jefferson was America's favorite actor. When he played his famous Rip Van Winkle (see picture), "one-night" towns declared a "Jefferson Holiday." Business stopped, schools closed, so that everyone would get a chance to see him act.

They loved Joe Jefferson everywhere for his genius at making people happy. And his sunny outlook still sparkles in the spirit of America. Like Joe Jefferson, Americans still know how to travel a hard road to reach their goals, how to smile when the going's roughest.

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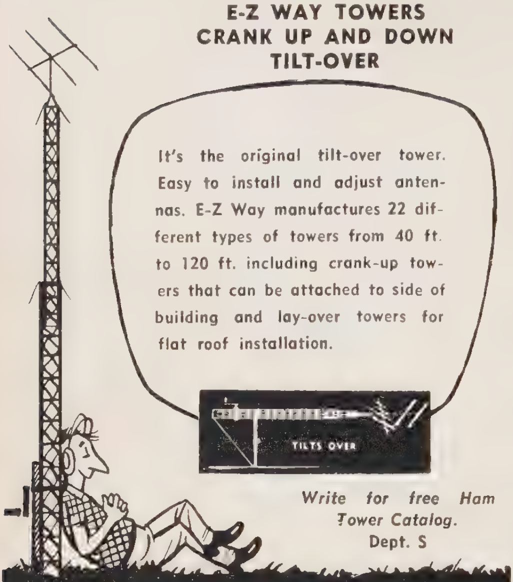

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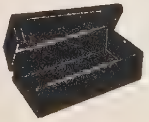

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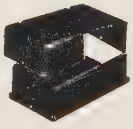

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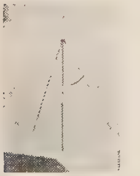

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LEECO 509 Skyview Drive
Nashville 6, Tennessee

[*from page 118*]

Dover, Delaware but didn't get his address I sure would appreciate any help on this one I operate mostly 15-meter CW. I've worked 30 countries so far including ZS6, EA8, OK1, YO5, KH6, FA, I, G, GM, F, CT, PAØ, OZ, ON4, SM and EK. My rig is a *Viking Adventurer* running about 50 watts to a long wire antenna. The receiver is an *HQ120-X*. I've had about 600 contacts since I've been on the air. I heard you on 15 talking to a VQ4, you were Q5 S8. I hope to work you on 15 phone or CW before long, Walt. Good luck and lots of DX. 73, Jim."

Help Wanted

Richard Light (13), 640 Riverside Drive, New York, New York. Telephone: AU 3-0742. Richard needs help in code and theory.

Joe Scott, 1002 Grove Street, Danville, Illinois, Phone: 9391. Joe wants help with the code and some pen pals.

Jim Raisler, Beach, North Dakota. Jim wants letters from SWLs who are interested in becoming hams. He has been an SWL for one and one-half years. He will answer all letters.

Ronald Wilensky (11), 920 East 17th Street, Apartment 422, Brooklyn, New York. Ronald needs a little help in code and theory.

Dick Naujoks, 158 Shotwell Park, Syracuse 6, New York. Dick is primarily interested in gaining more knowledge in code and getting a station ready.

That's the 30 sign for this month and may I take this opportunity to wish all of my new readers the best of season's greetings and to wish you the best of everything to come your way in the future. I wish that each of you can work all the DX you want and that all the novices will get their general class license. Don't forget to write me next year and tell me your ideas and wants. 73 and happy New Years, I'll be seeing you from these pages next year. 73, Walt.

NARROW SHIFT

[*from page 45*]

used for 850 cycle shift. Frequency multiplic tion by this "push-push" system is two p stage, succeeding stages permit multiplicati of 4, 8, 16, etc., but not a multiplier of for 170 cycle shift conversion to 850. T theory seems sound but if it takes two separa "mark" and "space" amplifiers and four se arate tuned band pass filters, it is not worth t complication as compared to simply anoth converter for narrow shift, especially as mu of the circuitry can be switched in for u with either shift. Bob Weitbrecht, W9TC conceived a similar system (using four crys diodes) independently and we may hear more from him if it works, as he has plans for trying it out.

Some half dozen stations are prepared to use narrow shift RTTY when generally authorized and these notes suggest tests and plans which will develop the best suited. The true "shiftless approach" to the problem is interesting because with zero shift the "mark" and "space" frequencies will always fade together instead of incoherent variations of 50 db or more, and AVC can be used along with infinite selectivity, zero band width, et al. Obviously some compromises will be made in practice, but 850 cycles is much wider than necessary and is therefore inefficient radio frequency spectrum utilization.

Notes on
"Simulated Short Shift"
W9BP/WØBP

	Transmitter "A"	Transmitter "B"	Phantom "C"
Mark	7141.28 kcs	7142.28 kcs	7141.28 kcs
Space	7140.45 kcs	7141.45 kcs	7141.45 kcs
Shift:	830 cps	830 cps	170 cps

Note: Phantom reception is a combination of the mark from transmitter "A" and the space from transmitter "B" and therefore receiver tuning should be between the two transmitters. When both transmitters are keyed on identical texts, a receiver by cross modulation may produce a substantially constant 1,000 cycle tone. Also note that the phantom simulates 170 cycle shift, but with space frequency high and mark low, which should further indentify the printing.

WAIT 'TIL NEXT YEAR

[*from page 51*]

with 22 zones and 60 countries.

Forty was open but inactive. 4X4 and HA were the best European DX. Paths were poor to ZL-VK. Ditto 80. The boys—most of them—simply didn't bother. Actually the European path was quite good. DJ1BZK poured 30 over 9 signals in on both bands. One got the impression, in W land, that only a few of the European gang bothered to listen above 7200 (a tip to all for the future . . . 7297 kc is one frequency where W's have a chance of escaping the full force of Radio Moscow, jammers, etc).

Generally speaking the 4X4 gang seemed to be doing the best job. HH3RH helped a lot of fellows out with a tough prefix for some parts of the world (we worked him on all bands except 160). CN8MM (Eva's expecting that first harmonic) and W1ATE (Chad's moving to Princeton, N.J.) were noticeable by their absence. Ditto W2SAI. You can expect high W scores from W4KWY and W3VKD.

Point is, the sun spots are back, and the totals are up. Even at the price of a pair of KW modulation transformers, it was worth it.

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2920	3075	4175	5950	6375	6825	7250	7675	8106.7
2925	3080	4215	5973.3	6400	6840	7273.7	7700	8125
2930	3085	4255	5975	6406.7	6850	7275	7706.7	8140
2935	3090	4295	6000	6425	6873.3	7300	7725	8150
2940	3100	4445	6006.7	6440	6875	7306.7	7740	8173.7
2945	3105	4490	6025	6450	6900	7325	7750	8175
2950	3110	4845	6040	6473.3	6906.7	7340	7773.7	8200
2955	3115	5385	6050	6475	6925	7350	7775	8206.7
2960	3120	5587.5	6073.3	6500	6940	7373.3	7800	8225
2965	3125	5675	6075	6506.7	6950	7375	7806.3	8240
2970	3130	5700	6100	6525	6973.3	7400	7825	8250
2975	3135	5725	6106.7	6540	6975	7406.7	7840	8273.3
2985	3140	5740	6125	6550	7000	7425	7873.7	8275
2990	3145	5750	6140	6573.3	7006.7	7440	7850	8300
2995	3150	5773	6150	6575	7025	7450	7875	8325
3000	3155	5775	6173.3	6600	7040	7473.7	7900	8350
3005	3160	5800	6175	6606.7	7050	7475	7906.7	8375
3010	3165	5806	6200	6625	7073.3	7500	7925	8400
3015	3170	5825	6206.7	6640	7075	7506.7	7940	8425
3020	3175	5840	6225	6650	7100	7525	7950	8450
3025	3180	5850	6240	6673.3	7106.7	7540	7973.7	8475
3030	3185	5873.3	6250	6675	7125	7550	7975	8500
3035	3190	5875	6273.3	6700	7140	7573.7	8000	8525
3040	3195	5880	6275	6706.7	7150	7575	8006.7	8550
3045	3655		6300	6725	7173.3	7600	8025	8575
3050	3700		6306.7	6750	7175	7606.7	8040	8600
3055	3825		6325	6773.3	7200	7625	8050	8625
3060	4045		6340	6775	7206.7	7640	8073.3	8650

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MAGAZINE BACK-ISSUES wanted: CQ, 1948, June, July, October; 1949, February, May June, October; 1951, November. Also Radio and Television News, 1949, January. Frank H. Tooker, Box T, Lakehurst, New Jersey.

WANTED: AMATEUR Ham gear and test equipment (used). What do you need and what do you have. I buy, sell, and trade. James Bryant, Box 363, Corbin, Kentucky.

WANTED: ARC-1, ARC-3, ART-13, CU-25, ARN-7, APR-4, APR-5, APR-9, BC-221, TS-173, TS-174, TS-323, TDQ, BC-610, BC-614, BC-939, BC-312, BC-342, BC-348, 32V, 75A, Teletype, TCS, Test equipment, tech manuals, amateur receivers and transmitters. Cash or trade for NEW Johnson Viking, Ranger, National, Hammarlund, Hallicrafters, Harvey Wells, Barker Williamson, Gonset, Elmac, Morrow, Central Electronics, Kuehne, Telrex, Fisher Hi-Fi, Pentron, Karlson and others. Write: Tom, W-1-AFN, Alltronics, Box 19, Boston 1, Mass. Richmond 2-0048. Stores: 44 Canal, Boston. 60 Spring, Newport, R. I.

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1 ART-13 xmtr complete with extra CFI unit and crystal tuning booklet and diagrams. Make offer. 1 model 12 teletype complete with extra parts, table, power supply, keyboard, W.E. tape sender, and full set W2BFD coils for converter, $75. 1 5-inch Dumont scope model 274 brand new, $75. 1-ARC5-VHF xmtr complete with tubes. Make offer. 1 Super-pro 400X excellent condition complete, $250. 1 Sonar MR-3 rcvr. make offer, new condition. W1DKR, RFD 1, Greene, R.I.

SELL: DUMONT #241 Scope, Collins 30-J Transmitter. NC-100. Want ARN-7, ART-13, ARC-1, Teletype, 1944 edition ARRL Handbook. Tom Howard, W-1-AFN, 46 Mt. Vernon St., Boston 8, Mass. Richmond 2-0916.

ARC-4 TRANSMITTER-receiver combination completely converted to two meters. Complete with crystal, tubes, and 115 VAC power supply. Excellent condition. A complete station for only $40. Also have Heath AT-1 in excellent condition, $22.50. W9JEQ, 124 North "E" Street, Monmouth, Illinois.

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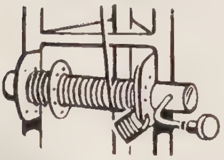

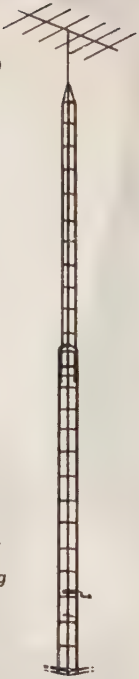

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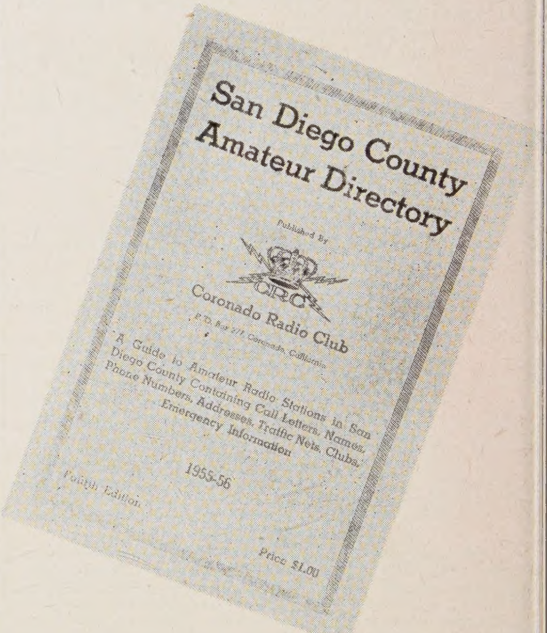

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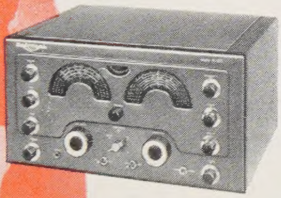

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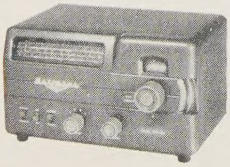

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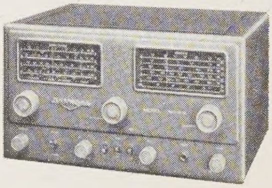

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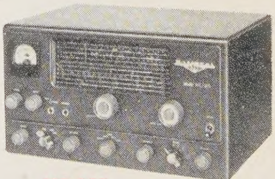

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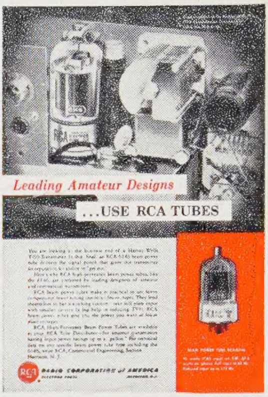
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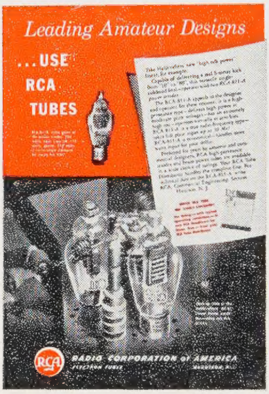
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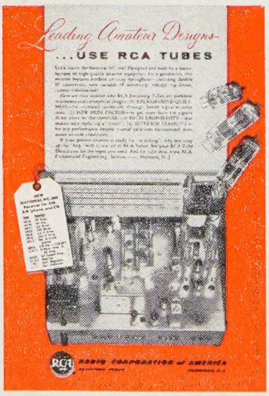
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